

Questions and Answers for Dental Nurses

third edition

Carole Hollins



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Questions and Answers for Dental Nurses

*This book is dedicated to all student dental nurses – past, present, and future.
The blood, sweat and tears really will be worth it in the end – and once qualified,
the world is your oyster.*

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3rd Edition

Carole Hollins



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Editorial Offices

9600 Garsington Road, Oxford, OX4 2DQ, UK

The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

2121 State Avenue, Ames, Iowa 50014-8300, USA

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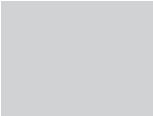
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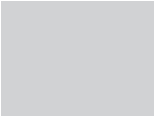
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Contents

<i>Foreword by Beverley Coker</i>	vii
<i>Introduction</i>	ix
<i>How to Use this Book</i>	xi
Domain 1: Clinical	1
1 General Anatomy and Physiology	3
Medical conditions	
Medications	
2 Oral Anatomy and Physiology	23
3 Dental Pathology and Microbiology	39
Risks to health	
4 Assessment and Diagnosis	65
History-taking	
Charting	
5 Restorative Dentistry and Dental Materials	85
Fillings	
Endodontics	
Prosthodontics	
6 Minor Oral Surgery, Local Anaesthesia and Anxiety Control	113
Domain 2: Professionalism	127
7 GDC Standards	129
8 Legal and Ethical Issues	139
Legislation	
Regulations	
Domain 3: Communication	155
9 Oral Health Instruction	157
Disease prevention	
Health advice	

10	Pre- and Post-operative Advice	173
11	Consent and Record-keeping	189
	Domain 4: Management and Leadership	197
12	Health and Safety	199
13	Teamwork	219
	Chair-side support	
	Reception duties	
14	Medical Emergencies	233
	First aid	
	<i>Index</i>	245



Foreword

I am delighted to have been invited to write the foreword for this book. Once again Carole Hollins responds to the fast-changing world of dental nursing with this new book, which will be invaluable not only to dental nurses in training but also other members of the dental team. Carole's passion and interest for dental nurse training and assessment is a very admirable quality and her speed in responding to the needs of dental nurses in training is commendable.

This book is an absolute must for those candidates sitting the National Examining Board for Dental Nurses (NEBDN) National Diploma in Dental Nursing. The General Dental Council (GDC) states that 'the purpose of education and training is to produce an individual who can demonstrate, on successful completion of an assessed education or training programme, that they have met the outcomes required for registration as a dental professional with the GDC'. Nurses using this book will find it an excellent companion to their training programme.

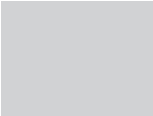
I have been fortunate to work with Carole for many years. We have spent a lot of time together developing the new diploma and spent many hours learning how to write questions for the final examination. Carole very quickly grasped the concept of the new design of questions. Sadly I was a little way behind her! I know through our work that the questions and answers in this book cover the dental nurse outcomes in the GDC's Preparing for Practice. This book will hopefully assist them in working towards a qualification that will lead them to become a 'safe beginner.'

Carole's name is synonymous with dental nursing as a result of her many nursing textbooks. After a fairly recent trip to Germany, where she examined some of my own students, they declared that she was the 'queen of dental nursing', a term that makes Carole squirm but which I think is very true. I feel that this book further adds to her royal status.

This book will go straight onto my recommended dental nurse reading list for my courses. It is an asset not only for those in training but also those wishing to further their knowledge for any post-registration examinations. Knowing Carole so well both professionally and personally I can vouch that she is extremely hard-working, committed and supportive of dental nursing. This book shows all her hard work and effort and I am very proud of her contribution to the world of dental nursing.

Good luck to readers using this book for revision for an examination – it is a real shame it wasn't around when I was training!

Beverley Coker MA Ed
Former Chairman National Examining Board for Dental Nurses (2008–2010)
Deputy Head of Dental Nursing and Training,
King's College Hospital NHS Foundation Trust



Introduction

This third edition of *Questions and Answers for Dental Nurses* has been completely rewritten to accommodate the changes made to the National Examining Board for Dental Nurses (NEBDN) registerable qualification, the National Certificate. In line with current educational best practice, the National Certificate has been superseded by the new qualification, the NEBDN National Diploma. A new curriculum has been produced, which broadly follows the General Dental Council's expected level of knowledge for dental nurses at qualification, as set out in their document *Developing the Dental Team*.

The new curriculum incorporates all aspects of the old NEBDN syllabus, but is set out in four domains, which mirror the GDC's Learning Outcomes: Clinical, Professionalism, Communication, and Management and Leadership. In addition, the format of the new Diploma examination has also changed. Entry to the examination is still dependent on full completion of the Record of Experience portfolio, and candidates will then be assessed by undertaking a two-part examination: a written paper followed by a practical examination. Candidates have to pass the written paper before being allowed to enter for the practical examination, which is held several weeks later.

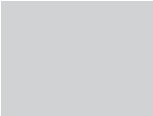
The new written paper consists of just two types of questions: 1 of 5 single best answer multiple choice questions (MCQs) and extended matching questions (EMQs). Full details of both question types with worked examples are given in the next section. The new practical examination has also changed, and now involves the completion of up to 15 Objective Structured Clinical Examinations (OSCEs). Again, details of these are given in the next section.

This third edition revision aid is designed to be used as a companion to the course textbook for the NEBDN National Examination, and is composed of four sections, laid out in 14 chapters and covering the whole National curriculum. Wherever possible, questions of both types are set in each chapter, but some areas of the curriculum are suitably assessed by MCQs only. Over the four domains, various MCQs can be used to cover several areas of the curriculum too, and have been repeated as necessary.

Students are advised to learn the subjects first using the textbook and their lecture notes, and then to test their level of knowledge and understanding using this questions and answers book. The correct answer for every MCQ in each chapter is given, along with an explanation of why a certain answer is the single best answer and, more importantly, why the other four choices are incorrect. Students should

find this useful in extending their depth of knowledge of the given subject. The extended matching questions assess students' knowledge in a different way, whereby the correct answer is matched to the scenario given in the question, rather than discounting other options as incorrect.

It is hoped that all students using the book will find it both instructive and informative, and an invaluable revision aid in their quest for qualification. Students following the NVQ route to qualification and registration will find the old style of MCQs and short answers for the National Certificate, as well as Parts A and B in the section covering the NVQ Independent Assessment (as it used to be called) of the second edition of this book, are currently still relevant to that qualification.



How to Use this Book

Details of the two question styles for the written paper, as well as an overview of the practical OSCEs is given below. Students are advised to read this section in full before attempting to use the book as a revision aid, as the new style of written questions and practical assessments are quite different from those used for the old National Certificate examination.

Multiple choice questions

The full title of the new style MCQ is 1 of 5 single best answer MCQ. They follow the form shown below.

- The question itself is usually one or two sentences long.
- The first sentence introduces the topic of the question.
- The final sentence asks the question.
- They are designed to test the application of the relevant knowledge.
- Key words or phrases are not highlighted.
- There are always five answer options.
- Only one of those five will be the ‘best’, and therefore the correct, answer.
- The answers are always homologous – of the same form (so, all microorganisms, all periodontal instruments, all filling materials, and so on).
- They are always set out alphabetically or numerically in ascending order.

As the question style always follows the same pattern, it is not possible for candidates to ‘work out by elimination’ or ‘guess’ the correct answer – they must have the relevant knowledge and the understanding to be able to apply it to the scenario of the question. Only then can the single best answer be identified.

Similarly, as a logical alphabetical or numerical order is always followed in the answers, the correct answer cannot be determined by seeing how many times, say, option (d) has been an answer and therefore not choosing it again. The single best answer will be at whichever option letter it falls at alphabetically or numerically only. So it is quite feasible for an examination to have option (d) as the correct answer for every question asked, if the correct answer happens to fall at option (d) alphabetically or numerically. Consequently, the candidate is unable to guess the answer.

Candidates mark their single answer choice on an optical marking sheet for each question, by pencilling in a small box through their chosen option. Only one box

must be filled in, otherwise the computer will reject that question. Similarly, the box must be filled in horizontally – drawing a circle around it or marking an answer option with a cross will also cause the computer to reject that question.

Below are three examples of the new style MCQs used in the new NEBDN National Diploma examination.

1. A gingivectomy procedure is to be carried out on an epileptic patient. The technique will involve the removal of hyperplastic gingival tissue from the buccal side of the upper left premolar teeth. Which one of the following nerves must be anaesthetised to allow the procedure to be carried out painlessly?
 - (a) Greater palatine nerve
 - (b) Inferior dental nerve
 - (c) Long buccal nerve
 - (d) Middle superior dental nerve
 - (e) Posterior superior dental nerve

The correct answer is (d). The question clearly states that only the buccal gingivae of the upper premolar teeth will be involved in the procedure, so the nerve supplying this area simply needs identifying from the options listed. Only the middle superior dental nerve is relevant to the question.

2. In patients suffering from chronic periodontitis, both supragingival and subgingival calculus may be present at the same time. Which one of the following periodontal instruments is used specifically to remove subgingival calculus?
 - (a) Curette
 - (b) Jaquette scaler
 - (c) Push scaler
 - (d) Sickie scaler
 - (e) Ultrasonic scaler

The correct answer is (a). The question asks for the instrument used specifically to remove subgingival calculus. Although an ultrasonic scaler can be used for this purpose, it is not specifically so, and can be used to remove supragingival calculus too. All the other options listed are used to remove supragingival calculus only and therefore option (a) is the single best answer.

3. Various regulations and legislations apply to the safe running of dental workplaces. Which one of the following applies to the COSHH regulations?
 - (a) Accidents at work
 - (b) Chemicals
 - (c) Fire extinguishers
 - (d) Pressure vessels
 - (e) Radiation hazards

The correct answer is (b). The candidate must know what COSHH stands for, and is relevant to, before being able to choose the single best answer from the options list.

Extended matching questions

This style of question follows a similar layout to the MCQ in some respects and was introduced to replace the short answer style question. The short answer style question, such as those used in Section 3 of Part A in the National Certificate examination, allowed candidates to supply their own answer in the space provided. This then created many ‘partially correct’ answers, which had to be considered and either included or discounted from a definitive marking guide before the paper could be marked.

With extended matching questions, this problem is overcome as all candidates have the same definitive option list provided for each set of questions in the examination paper. There is no opportunity for candidates to create an answer, as only the options listed can be used.

Each options list has several questions (a question set) attached to it. The EMQ style questions follow the form shown below.

- The topic covered by the question set is stated, to help focus the candidate’s thoughts.
- A lead-in statement is then given which explains what candidates are required to do, and how many options they are required to choose from the list, for each question.
- The option list is then given, and it will usually contain a minimum of eight options.
- The options are always homologous – of the same form (so all surgical instruments, all microorganisms, and so on).
- They are always set out alphabetically or numerically in ascending order.
- The questions are set out as several sentences giving a detailed scenario.
- They are designed to test analytical and reasoning skills, as well as requiring a more detailed and concise application of knowledge.
- Key words or phrases are not highlighted.
- Each topical option list has several questions set to it.

The candidate is required to understand the question and apply detailed knowledge to be able to reason the answer(s) from the option list. Below are two different examples of a question set, each with its own option list, of the EMQ style of question used in the new NEBDN National Diploma examination:

Topic: Dental pathology

For each of the following dental pathology questions, select the single most appropriate microorganism from the option list. Each option might be used once, more than once, or not at all.

- (a) *Bacillus fusiformis*
- (b) *Candida albicans*
- (c) Coxsackievirus

- (d) Epstein–Barr virus
- (e) Herpes simplex
- (f) Paramyxovirus
- (g) *Porphyromonas gingivalis*
- (h) *Staphylococcus aureus*
- (i) *Streptococcus mutans*

1. An 18-year-old patient attends the surgery as an emergency, complaining of severe gingival pain and halitosis. He admits to being a smoker and brushing his teeth only once every few days. On examination, his oral hygiene is very poor and his gingivae are swollen and sloughing at the papillae. The dentist diagnoses acute necrotising ulcerative gingivitis. Which one of the options listed is a microorganism associated with this condition?

The correct answer is (a). The clinical scenario describes the signs and symptoms of the condition, and then states the disease present. Candidates must then apply their knowledge of microorganisms that cause this condition, and locate it from the option list. With a more extensive option list, the lead-in statement could ask for two appropriate microorganisms from the list, making it a harder question still.

Alternatively, the name of the disease diagnosed could be left out of the question, so that the candidate then has to determine it from the signs and symptoms described, before being able to choose the correct option from the list. Again, this would then become a harder question still.

2. Many adult patients suffer from chronic periodontitis, especially those with risk factors such as smoking and certain medical conditions. Research has discovered that there are many different microorganisms involved in this condition, some of which occur in most patients while others are found less often. Which one of the options listed is one of the microorganisms linked to chronic periodontal disease?

The correct answer is (g). As the question stem states, many microorganisms have been linked to chronic periodontal disease, but the only one listed as an option is *Porphyromonas gingivalis*. Others include *Actinomyces* species, *Prevotella intermedia* and *Treponema denticola*. Again, if any of these had been added to the option list, the question could have asked for more than one choice to be stated, making the question harder.

The following example shows a style of questioning that requires analysis and reasoning by the candidate.

Topic: Oral health advice and procedures

For each of the following oral health scenarios, select the single most appropriate point of advice or instruction from the option list. Each option might be used once, more than once, or not all.

- (a) Advice on toothbrushing
- (b) Apicectomy
- (c) Completion of a diet sheet
- (d) Disclosing tablet use
- (e) Flossing instruction
- (f) Fluoride tablet use
- (g) Fluoride toothpaste use
- (h) Gingivectomy
- (i) Prophylaxis polishing
- (j) Reduce acid intake
- (k) Reduce sugar intake
- (l) Subgingival scaling
- (m) Supragingival scaling
- (n) Tooth restoration with amalgam filling
- (o) Tooth restoration with crown

1. A 23-year-old female office assistant attends the practice with a chipped tooth, which occurred the previous evening at a local bar. She complains of general tooth sensitivity to cold foods and drinks for the past few months, and is concerned that her teeth are ‘crumbling’ despite her low-sugar diet. On examination, the dentist discovers a minimal incisal edge chip of the lower left central incisor that requires smoothing only. There are no cavities and the teeth have clean shiny enamel generally. Which one of the options listed is the most likely advice to be given to this patient?

The correct answer is (j). The candidate must analyse the information given in the question in order to determine the following points. Clean shiny enamel with thinning incisal edges is a classic sign of acid erosion. The general sensitivity of the teeth has been produced by the gradual thinning and stripping away of the enamel surface layers, so that the pulp tissue is more easily thermally stimulated.

2. A 35-year-old male attends the practice with a painless sinus associated with the upper right central incisor, which has been present intermittently for several months. He complains of an occasional bad taste and tenderness over the tooth. On examination, the dentist notes that the tooth has a firm and well-fitting crown present, and a radiograph shows the presence of a post in the root filled tooth. Which one of the options listed is the procedure most likely to be recommended for this patient?

The correct answer is (b). The candidate must analyse the information given in the question in order to determine the following points. The tooth is already root filled and the canal is sealed with a post crown restoration. Recurrent infection has occurred at the apex of the tooth, which can be successfully managed by an apicectomy procedure. The alternatives would be to remove the post crown and perform a repeat root fill of the tooth (so requiring a new post crown), or to extract the tooth.

Objective Structured Clinical Examination (OSCE)

For the sake of completeness, an overview of the practical element of the NEBDN National Diploma examination is given here in order to assist candidates in readying themselves for the final part of the new examination. Candidates must pass the written paper first, before being allowed to take the OSCE element of the examination. Therefore the written paper and the OSCE will usually be held several weeks apart, so that the written papers can be marked first and a candidate list produced for the OSCEs.

The practical section of the old National Certificate examination involved candidates carrying out two tests within 5 minutes, typically a mixing test followed by an instrument selection test for a set procedure. While performing these tests, examiners were able to ask candidates further relevant questions, as they wished. The final section of the examination was in the form of an oral questioning session, which until recently could be about any topics chosen by the examiner.

The problem with both of these sections was that candidates were asked different questions, at different knowledge levels, by whichever examiner they were allocated to within an examination centre. The tests were therefore unstructured and were subjective rather than objective, so that a candidate's performance was graded according to the opinion of the examiner at the time rather than against set criteria.

The new style of practical examination, the OSCE, is completely different, and provides a far more accurate and fairer assessment of every candidate. As the name suggests, it is both objective and structured in the way that candidates are assessed – the examiner does not ask any questions but simply grades clinical performance against set criteria as the candidate carries out the task.

Each examination sitting will have up to 15 OSCE stations that every candidate must go through, and they are usually timed at 5 minutes each. Other than to welcome candidates to each test area and ask if they have read the 'candidate instructions' for the test beforehand, the examiner merely observes their performance within the 5-minute timing.

There are four general types of practical assessment that the OSCE will cover, and each is designed to test both the professional and practical skills of the candidate.

- *Communication skills*, such as giving specific oral hygiene advice to a patient (who will be a professional actor).
- *Medical emergency*, such as an asthma attack scenario (again, possibly involving a professional actor).
- *Mixing*: any material from within the curriculum.
- *Clinical*, such as setting up instruments for a specific dental procedure, or completing a charting exercise.

The candidate instructions will give the scenario relevant to the station, and the candidate is able to read these instructions before the 5-minute timing starts. The

instructions will be clear and concise, so that the task to be carried out is obvious. Where a patient (actor) is involved in the scenario, the candidate will be scored by both the examiner and the patient.

To ensure that every candidate is assessed objectively, the following system is followed.

- Every examination centre will carry out exactly the same OSCE assessments, using exactly the same resources.
- All candidate and patient instructions will be worded exactly the same, in every centre.
- All candidates will be marked against the same performance criteria, and in the same way, as the examiners have been trained and calibrated to each other.
- All candidates will rotate through the OSCE stations in a set order until they have completed the full cycle.
- A single timer is used for each cycle of stations (usually a bell), so candidates cannot have too little, or too much, time at any station.
- All candidates are allowed 1 minute to read the scenario and candidate instructions for each station, before entering the station and beginning the assessment when the bell rings.
- No candidate is allowed to enter the station until the start of the 5 minutes.
- The candidate may repeat the assessment within the 5-minute time period if so wished.
- The examiner will not ask any questions of the candidate.
- Candidates may carry out the task while talking their way through it, if they wish – they will only be graded on the performance criteria listed on the examiner mark sheet.
- There are no ‘killer stations’ where the candidate must pass that one station or be failed for the whole OSCE examination.



Domain 1: Clinical

1

General Anatomy and Physiology

Multiple choice questions

1. The heart is a muscular pump situated in the thoracic cavity. Which one of the following blood vessels delivers oxygenated blood from the lungs to the left atrium?
 - (a) Aorta
 - (b) Inferior vena cava
 - (c) Pulmonary artery
 - (d) Pulmonary vein
 - (e) Superior vena cava

2. The liver is a large organ situated in the upper region of the abdominal cavity. It is an accessory organ of the digestive system and has many functions, including which one of the following?
 - (a) Clotting factor production
 - (b) Erythrocyte production
 - (c) Insulin production
 - (d) Leucocyte production
 - (e) Pepsin production

3. During respiration, the amount of oxygen and carbon dioxide within the lungs alters during the process of gaseous exchange. Which one of the following represents the approximate amount of carbon dioxide present in expired air?
 - (a) 4%
 - (b) 8%
 - (c) 12%
 - (d) 16%
 - (e) 20%

4. Food is moved through various sections of the digestive tract by the involuntary action of its smooth muscle walls. These act rhythmically to create a wave-like movement along the gut that carries the food mass along. Which one of the following is the correct term for this movement?
 - (a) Deglutition
 - (b) Digestion
 - (c) Dysphagia
 - (d) Mastication
 - (e) Peristalsis
5. The function of the lungs is to allow the uptake of oxygen from air into the blood, and the removal of carbon dioxide from the blood to the air. Which one of the following is the anatomical structure where this gaseous exchange process occurs?
 - (a) Alveoli
 - (b) Aorta
 - (c) Bronchiole
 - (d) Pulmonary artery
 - (e) Trachea
6. The three main types of blood vessel found throughout the body are arteries, capillaries and veins. An anatomical feature found specifically in larger veins prevents the backflow of blood. Which one of the following is this feature?
 - (a) Muscular walls
 - (b) Rich blood supply
 - (c) Thick elastic layer
 - (d) Thin endothelium
 - (e) Valves
7. A new patient attends the surgery for a routine dental examination. On completion of her medical history form it is noted that she is taking salbutamol. Which one of the following conditions is the patient most likely to have?
 - (a) Angina
 - (b) Asthma
 - (c) Diabetes
 - (d) Epilepsy
 - (e) Fainting
8. A patient attending for an examination complains of a sore tongue, and the dentist diagnoses xerostomia. Which one of the following medications is most likely to be associated with this condition?
 - (a) Analgesic
 - (b) Antihistamine
 - (c) Bisphosphonate
 - (d) Diuretic
 - (e) Hormone replacement

9. During respiration, the amount of oxygen and carbon dioxide within the lungs alters during the process of gaseous exchange. Which one of the following represents the approximate amount of oxygen in expired air?
 - (a) 4%
 - (b) 8%
 - (c) 12%
 - (d) 16%
 - (e) 20%
10. A medication taken by a patient will eventually break down and be excreted. Which one of the following conditions is most likely to affect this detoxification process?
 - (a) Duodenal ulcer
 - (b) Gallstones
 - (c) Kidney stones
 - (d) Liver disease
 - (e) Ulcerative colitis
11. On completing a medical history form, a patient has disclosed that he suffers from ulcerative colitis and is taking long-term steroids for the condition. Which one of the following areas of the digestive system is most likely to be affected by this condition?
 - (a) Large intestine
 - (b) Liver
 - (c) Pancreas
 - (d) Small intestine
 - (e) Stomach
12. All body cells require oxygen in order to work and function. Which one of the following is the means by which it is transported from the lungs to the heart and then around the body?
 - (a) Erythrocytes
 - (b) Leucocytes
 - (c) Plasma
 - (d) Platelets
 - (e) Thrombocytes
13. During the act of swallowing, the bolus of food is moved from the mouth into the throat by the voluntary action of the tongue muscles. Once beyond the mouth, the bolus is prevented from being inhaled instead of swallowed by an anatomical structure that seals the trachea. Which one of the following is the structure referred to?
 - (a) Epiglottis
 - (b) Larynx
 - (c) Pharynx

- (d) Tongue
 - (e) Vocal cords
14. Carbon dioxide is the waste product formed by cells as they work to produce energy. It is transported from the cells to the heart, and then to the lungs for removal from the body during expiration. Which one of the following is the means by which this is achieved?
- (a) Erythrocytes
 - (b) Leucocytes
 - (c) Plasma
 - (d) Platelets
 - (e) Thrombocytes
15. On a medical history form a patient has disclosed that she has been diagnosed with type II diabetes and has been prescribed metformin. Which one of the following oral health problems may be caused by this condition?
- (a) Angular cheilitis
 - (b) Aphthous ulcers
 - (c) Erosion
 - (d) Poor wound healing
 - (e) Stomatitis
16. Throughout the nervous system, nervous impulses are transmitted as electrical charges along specialised cells, the neurones. Which one of the following conditions is most likely to occur when electrical activity becomes suddenly disorganised?
- (a) Grand mal
 - (b) Motor neurone disease
 - (c) Multiple sclerosis
 - (d) Myocardial infarction
 - (e) Stroke
17. A patient attends for root canal therapy and restoration of the upper right canine tooth following loss of vitality after a blow to the face. Which one of the following medical conditions must be ruled out before proceeding with the endodontic treatment?
- (a) Asthma
 - (b) Bronchitis
 - (c) Eczema
 - (d) Latex allergy
 - (e) Penicillin allergy
18. Patients who have undergone surgery and have been incapacitated for a while are at risk of developing a deep vein thrombosis. Which one of the following blood vessels is most likely to become blocked if the thrombus becomes dislodged?

- (a) Aorta
 - (b) Brachial artery
 - (c) Carotid artery
 - (d) Coronary artery
 - (e) Pulmonary artery
19. The nervous system is composed of the brain, spinal cord and the peripheral nerves. The peripheral nerves supplying the head and neck region are called the cranial nerves, and they consist of 12 pairs. Which one of the following pairs of cranial nerves is of most relevance to the inner structures of the oral cavity?
- (a) III and V
 - (b) III and X
 - (c) IX and XII
 - (d) V and XII
 - (e) VII and IX
20. A patient attends the surgery for a routine dental examination, and updates her medical history form as requested. On checking the form, the dentist notices that the patient has stated that she has recently been diagnosed with cirrhosis. Which one of the following organs is most likely to be affected by this condition?
- (a) Colon
 - (b) Gallbladder
 - (c) Liver
 - (d) Pancreas
 - (e) Stomach
21. The pancreas is an accessory organ of the digestive system and lies in the upper abdominal cavity near the stomach. It is essentially a glandular organ, and has many important functions including all except which one of the following options?
- (a) Bile production
 - (b) Carbohydrate digestion
 - (c) Fat digestion
 - (d) Insulin production
 - (e) Protein digestion
22. A patient attends the dental surgery for a surgical extraction of the upper right first molar tooth, under inhalation sedation. However, he has recently been diagnosed with bronchitis so the procedure is cancelled. Which one of the following is the most likely effect that this condition has on the bronchi?
- (a) Alveolar widening
 - (b) Blockage
 - (c) Dryness

- (d) Hypersensitivity response
 - (e) Inflammation
23. Some patients develop blood clots within their circulation following surgery or after a period of immobility. These blood clots may eventually break free and pass throughout the circulation. Which one of the following is the most likely event when the clot becomes lodged in a cranial blood vessel?
- (a) Angina attack
 - (b) Deep vein thrombosis
 - (c) Myocardial infarction
 - (d) Pulmonary embolism
 - (e) Stroke
24. On a medical history form a patient has disclosed that she contracted hepatitis B while on holiday abroad 3 years ago. Which one of the following conditions is most likely to develop due to this infection?
- (a) Duodenal ulcer
 - (b) Leukaemia
 - (c) Liver carcinoma
 - (d) Oral carcinoma
 - (e) Pancreatitis
25. From time to time, a patient who carries an International Normalised Ratio (INR) card may attend the surgery for dental treatment. Which one of the following medical conditions does the patient suffer from?
- (a) Angina
 - (b) Hypertension
 - (c) Hypotension
 - (d) Myocardial infarction
 - (e) Stroke
26. The base of the skull has numerous anatomical holes that allow the passage of nerves and blood vessels to and from the cranium. Which one of the following is the name of the anatomical hole through which the spinal cord passes?
- (a) Foramen magnum
 - (b) Foramen ovale
 - (c) Foramen rotundum
 - (d) Mandibular foramen
 - (e) Mental foramen
27. On a medical history form a patient has disclosed that he suffers from gastric reflux and has been prescribed omeprazole. Which one of the following oral health problems may be caused by this condition?
- (a) Aphthous ulcers
 - (b) Attrition

- (c) Erosion
 - (d) Glossitis
 - (e) Xerostomia
28. The coronary arteries are the blood vessels which supply oxygenated blood to the heart muscle itself. In some patients, these blood vessels may become partially blocked by fatty deposits within the arteries themselves. Which one of the following symptoms is a patient with this condition most likely to experience?
- (a) Hypotension
 - (b) Oedema
 - (c) Pain on exertion
 - (d) Slow heart rate
 - (e) Thready pulse
29. A new patient attends the dental surgery for a routine examination, and completes a medical history form. He states that he suffers from type II diabetes. Which one of the following organs is dysfunctional in patients with this condition?
- (a) Gallbladder
 - (b) Liver
 - (c) Pancreas
 - (d) Spleen
 - (e) Stomach
30. On a medical history form a patient has disclosed that she has recently been diagnosed with osteoarthritis, affecting her wrists, shoulders and neck. Which one of the following oral health problems may be caused by this condition?
- (a) Excess salivation
 - (b) Gagging
 - (c) Poor denture retention
 - (d) Poor oral hygiene
 - (e) Poor wound healing
31. Throughout the body, there are specialised areas of tissue that are responsible for the release of various chemicals directly into the bloodstream. These specialised areas of tissue are called endocrine glands. Which one of the following is classed as an endocrine gland?
- (a) Gallbladder
 - (b) Pancreas
 - (c) Parotid gland
 - (d) Sublingual gland
 - (e) Submandibular gland
32. During minor oral surgery procedures, the patient is likely to experience bleeding at the surgical site. In fit healthy patients this can easily be controlled by the dental team, but other patients with various medical conditions may

have to be treated with great caution. Which one of the following medical conditions would not cause concern in this instance?

- (a) Angina
 - (b) Deep vein thrombosis
 - (c) Haemophilia
 - (d) Pulmonary embolism
 - (e) Stroke
33. When patients attend the dental surgery, they are required to complete a medical history form that requests information on any medications they receive. Which one of the following medications is most likely to require the use of a non-adrenaline local anaesthetic?
- (a) Analgesics
 - (b) Antiepileptics
 - (c) Contraceptive pill
 - (d) Steroids
 - (e) Thyroxine
34. On a medical history form a patient has disclosed that he suffers from bronchial asthma. Which one of the following is the most likely effect that this condition has on the bronchi?
- (a) Alveolar widening
 - (b) Blockage
 - (c) Dryness
 - (d) Hypersensitivity response
 - (e) Inflammation
35. The three main types of blood vessels found throughout the body are arteries, capillaries and veins. An anatomical feature found specifically in larger arteries prevents the backflow of blood. Which one of the following features is the one referred to?
- (a) Muscular walls
 - (b) Rich blood supply
 - (c) Thick elastic layer
 - (d) Thin endothelium
 - (e) Valves
36. A 30-year-old patient attends the practice complaining of pain following recent extraction of a permanent first molar tooth. You notice from the patient's medical history that she is allergic to penicillin. Which one of the following medications is most appropriate for this patient?
- (a) Aciclovir
 - (b) Amoxicillin
 - (c) Erythromycin
 - (d) Nystatin
 - (e) Paracetamol

37. A new patient attends the surgery for a routine dental examination. Her medical history form notes that she has been prescribed glyceryl trinitrate. Which one of the following conditions is the patient most likely to suffer from?
- (a) Angina
 - (b) Asthma
 - (c) Diabetes
 - (d) Epilepsy
 - (e) Fainting
38. The three main types of blood vessels found throughout the body are arteries, capillaries and veins. An anatomical feature found specifically in capillaries allows rapid gaseous exchange to occur. Which one of the following features is the one referred to?
- (a) Muscular walls
 - (b) Rich blood supply
 - (c) Thick elastic layer
 - (d) Thin endothelium
 - (e) Valves
39. The heart is a muscular pump situated in the thoracic cavity. It receives deoxygenated blood from the head and neck region into the right atrium. Which one of the following is the vessel through which this occurs?
- (a) Aorta
 - (b) Inferior vena cava
 - (c) Pulmonary artery
 - (d) Pulmonary vein
 - (e) Superior vena cava
40. A 24-year-old patient has just had his lower right third molar tooth extracted and has been given the necessary postoperative advice. Which one of the following analgesics is the patient advised to avoid after this procedure?
- (a) Aspirin
 - (b) Co-codamol
 - (c) Codeine
 - (d) Ibuprofen
 - (e) Paracetamol
41. A patient attends the surgery with the upper left incisor teeth fractured at the gingival margin, following a car accident. Which one of the following medical conditions would persuade the dentist to recommend extraction rather than root canal therapy in order to avoid bacteraemia?
- (a) Angina
 - (b) Emphysema
 - (c) Epilepsy
 - (d) Haemophilia
 - (e) Valvular heart disease

42. It is a regulatory requirement to take a full medical history when a patient attends for dental treatment. Which one of the following medical conditions is the most likely to affect the oral cavity?
- (a) Angina
 - (b) Diabetes
 - (c) Hepatitis
 - (d) Hyperthyroidism
 - (e) Ulcerative colitis
43. Erythrocytes are disc-shaped cells that contain no nucleus, so they cannot divide and replace themselves as other cells do. A constant supply is therefore made throughout life. Which one of the following anatomical structures is where this occurs?
- (a) Bone marrow
 - (b) Cartilage
 - (c) Liver
 - (d) Lymphatic system
 - (e) Spleen
44. The trachea is part of the upper respiratory system and transports air from the throat to the bronchi. The trachea is prevented from collapsing during breathing movements by the presence of which one of the following anatomical features?
- (a) Cartilage rings
 - (b) Cilia
 - (c) Elastic layer
 - (d) Muscular walls
 - (e) Valves

Extended matching questions

General anatomy and physiology

For each of the following anatomy and physiology questions, select the single most appropriate anatomical structure from the option list below. Each option might be used once, more than once, or not at all.

- (a) Bone marrow
- (b) Gallbladder
- (c) Heart
- (d) Large intestine
- (e) Liver
- (f) Lungs
- (g) Pancreas
- (h) Small intestine

- (i) Spleen
 - (j) Stomach
1. Several organs in the body have roles as glands, where hormones and enzymes are manufactured and released into the body. Hormones act to alter the specific action of their target cells, while enzymes initiate chemical reactions in various cells and tissues. Which one of the options listed is the anatomical structure that produces the enzyme pepsin?
 2. Blood is composed of several different types of cells suspended in the fluid plasma. It has many functions, including the transport of oxygen and carbon dioxide to and from body tissues, the transport of hormones and nutrients around the body, defence against diseases, and the transport of waste products around the body. Which one of the options listed is the anatomical structure where oxygen-transporting cells are made?
 3. During normal bodily functions, ingested food is broken down and absorbed into the circulatory system for transport around the body to be used as an energy source by the body cells. The resultant waste products are gradually collected and transported to various organs for elimination from the body. Which one of the options listed is the anatomical structure where the majority of food digestion occurs?
 4. Several organs in the body have more than one function to perform in order for the cells and tissues of the whole body to work and grow correctly. The organs do not function in isolation from each other, rather they function together and alter their actions according to chemical or electrical messages received from other body areas, so that the body works together as a whole organism. Which one of the options listed is the anatomical structure responsible for the detoxification of drugs?
 5. Several organs in the body have roles as glands, where hormones and enzymes are manufactured and released into the body. Hormones act to alter the specific action of their target cells, while enzymes initiate chemical reactions in various cells and tissues. Which one of the options listed is the anatomical structure that produces the hormone insulin?

Medical conditions

For each of the following medical history scenarios, select the single most appropriate medical condition from the option list below. Each option might be used once, more than once, or not at all.

- (a) Angina
- (b) Asthma
- (c) Chronic bronchitis

- (d) Cirrhosis
- (e) Diabetes
- (f) Epilepsy
- (g) Gastric ulcer
- (h) Hypertension
- (i) Osteoarthritis
- (j) Stroke

1. Some medical conditions have a genetic link, and can occur in several generations of a family. Other conditions may be present from birth, while others occur with increasing age as a natural 'wearing out' process. Many others develop due to the patient being exposed to risk factors, such as smokers who develop lung cancer. Which one of the options listed is a medical condition that develops in patients who are exposed to high levels of atmospheric pollution, such as occurs in industrialised cities?
2. A patient attends the surgery for the extraction of a grossly carious molar tooth, which has been causing pain for some time. He has been unable to attend previously because of an illness that required hospitalisation. His medical history form notes that he takes warfarin and has regular blood tests for his INR score. Which one of the options listed is the medical condition that required the patient's hospitalisation?
3. Some medical conditions have a genetic link, and can occur in several generations of a family. Other conditions may be present from birth, while others occur with increasing age as a natural 'wearing out' process. Many others develop due to the patient being exposed to risk factors, such as smokers who develop lung cancer. Which one of the options listed is a medical condition that develops over time and is linked to various risk factors, including obesity, increasing age and smoking?
4. Many drugs taken for certain medical conditions have unwanted side-effects that cause further medical problems for the patient. In severe cases, the patient may then have to be prescribed further medication to treat the side-effects, or may have to stop treatment with the initial drug altogether. Which one of the options listed is the medical condition most often associated with long-term use of NSAIDs, such as aspirin?
5. Some medical conditions have a genetic link, and can occur in several generations of a family. Other conditions may be present from birth, while others occur with increasing age as a natural 'wearing out' process. Many others develop due to the patient being exposed to risk factors, such as smokers who develop lung cancer. Which one of the options listed is a medical condition affecting the pancreas, which often has a genetic link and occurs in several generations of a family?

Answers

Multiple choice questions

1. *Correct answer: d.* The pulmonary vein is the only vein in the body to carry oxygenated blood, and it runs from the lungs to the left atrium of the heart. The other options are the various arteries and veins that run to or from the heart.
2. *Correct answer: a.* Insulin is made in the pancreas, pepsin in the stomach, and the red and white blood cells (erythrocytes and leucocytes respectively) are produced in various organs of the immune system. The liver is responsible for the production of several of the clotting factors that allow the blood to clot when exposed to air, as occurs following an injury to a blood vessel.
3. *Correct answer: a.* Inhaled air contains a minute amount of carbon dioxide, while the amount in expired air is 100 times greater, at 4%, due to the vast amounts formed as a waste product during normal cellular activities. Conversely, inspired air contains 20% oxygen which reduces to 16% in expired air, as the cells use 4% to carry out their activities.
4. *Correct answer: e.* Deglutition is the correct term for swallowing, digestion is the process of breaking down ingested foods for use as fuel for normal body functions, dysphagia is the medical condition of being unable to swallow, and mastication is the correct term for chewing of food.
5. *Correct answer: a.* The alveoli are the microscopic air bags that form the ends of the respiratory system. They form the majority of the tissue of the lungs, and allow gaseous exchange to occur effectively by being just one cell thick. Air passes through the tiny tube-like bronchioles to reach the alveoli.
6. *Correct answer: e.* Only veins contain valves, as they do not have the thick elastic layer and muscular walls of arteries that ‘pulse’ the blood along their length. A rich blood supply and thin endothelium are features of capillaries.
7. *Correct answer: b.* Salbutamol is a medicine provided as an inhaler for asthmatics, to be used as required. It is not provided for any other medical condition listed in the options list.
8. *Correct answer: d.* Diuretics are often referred to as ‘water tablets’ by the lay public, and are prescribed to patients with heart conditions where the fluid load needs to be reduced. The tablets therefore cause increased urination, as well as having the side-effect of reducing other bodily fluids, including saliva and tears. Some patients then tend to develop a ‘dry mouth’ or xerostomia. None of the other drugs in the options list have this side-effect.
9. *Correct answer: d.* Inspired air contains 20% oxygen, and 4% of it is used by the body tissues to work and produce energy for normal cellular activity. So only 16% is expired.

10. *Correct answer: d.* One of the main roles of the liver is to break down, or detoxify, drugs and medicines before they are excreted from the body either by the kidneys or the bowels. Any medical condition or disease process that affects the normal working of the liver will therefore have an impact on how successfully this detoxification process can occur. None of the other medical conditions in the options list will have an effect on this process.
11. *Correct answer: a.* Ulcerative colitis is a disease process affecting the colon of the large intestine. Together with Crohn's disease, the two conditions are referred to collectively as inflammatory bowel disease. Ulcerative colitis does not affect any other section of the digestive tract except the colon.
12. *Correct answer: a.* The red blood cells – erythrocytes – transport oxygen around the body. Oxygen atoms attach to the iron-containing compound haemoglobin, forming the complex compound oxyhaemoglobin that gives arterial blood its distinctive cherry red colour. Oxygen is not transported in any other way throughout the circulatory system.
13. *Correct answer: a.* The epiglottis is an anatomical structure composed of cartilage, which lies in the throat. When the act of swallowing occurs, the larynx is raised so that the epiglottis falls across the top opening of the trachea, and prevents food and fluids from entering the respiratory system. Although all the other options in the list are situated in this anatomical area, they have no role in sealing off the trachea.
14. *Correct answer: c.* The majority of the waste product carbon dioxide, which is produced during normal cellular activity, is transported from the body tissues to the lungs for excretion as bicarbonate ions dissolved in the plasma. It does not become attached to any blood cells for transportation, as oxygen does.
15. *Correct answer: d.* Diabetics are notorious for developing poor wound healing, as their peripheral nerve and circulatory tissues are damaged by the condition, over time. They are therefore more prone to chronic diseases such as periodontitis too. Angular cheilitis and stomatitis are conditions that develop due to infection with the fungus *Candida albicans*, aphthous ulcers are thought to be diet or stress related, and erosion is the loss of tooth surface that occurs when teeth are exposed to dietary acids.
16. *Correct answer: a.* Grand mal is the severe form of epilepsy, where sufferers have tonic-clonic seizures due to a sudden disorganised burst of electrical activity in the brain. Motor neurone disease and multiple sclerosis are degenerative disorders affecting the fatty sheaths of the neurones themselves, while myocardial infarction and stroke are circulatory disorders.
17. *Correct answer: d.* It is best practice to use rubber dam during endodontic procedures in order to avoid recontamination of the root canal with oral bacteria, as well as to provide excellent moisture control. Although non-latex

dam sheets are available, many dental workplaces still use latex-based ones, so the patient must be screened for latex allergy before the dam is applied. Failure to do so could result in an anaphylactic reaction, which would put the patient's life at risk. None of the other options listed would contraindicate endodontic treatment.

18. *Correct answer: e.* A deep vein thrombosis occurs on the venous side of the circulation, where the blood vessels transport deoxygenated blood to the right side of the heart and then to the lungs. The pulmonary artery is the only artery in the body that carries deoxygenated blood, and it does so from the right side of the heart directly to the lungs, where the blood becomes reoxygenated. As the vessel narrows in width, the thrombus will become stuck and block the vessel, resulting in death if not diagnosed and treated immediately as a medical emergency.
19. *Correct answer: d.* The main cranial nerve supplying the oral cavity is the trigeminal nerve (V), which supplies the majority of the sensation from the teeth and oral soft tissues to the brain. The hypoglossal nerve (XII) supplies the majority of the muscles of the tongue. Cranial nerve III, the oculomotor nerve, supplies the eye and has no relevance to the oral cavity.
20. *Correct answer: c.* Cirrhosis of the liver is a disease often, but not exclusively, associated with a high alcohol intake over several years, and is being diagnosed in younger patients nowadays. This is believed to be linked to 'binge drinking'. The condition is also occasionally found in patients suffering from some blood disorders, and it does not affect any other organ except the liver.
21. *Correct answer: a.* Bile is the green liquid formed by the liver and stored in the gallbladder, and is associated with the emulsification of fats. The pancreas has many functions, including all the other options listed, as it is responsible for the manufacture and release of many digestive enzymes.
22. *Correct answer: e.* As with any medical condition ending in 'itis', bronchitis is the inflammation of the bronchi. Alveolar widening occurs in emphysema, blockage occurs when the patient has inhaled a foreign body and is choking, dryness occurs in cystic fibrosis, and a hypersensitivity response occurs during an asthma attack.
23. *Correct answer: e.* A stroke is the sudden loss of oxygenated blood supply to an area of the brain, usually due to a thrombus, as in this scenario. When the coronary arteries of the heart are affected, a myocardial infarction will occur. When the clot passes from the leg veins (a deep vein thrombosis) and becomes lodged in the pulmonary artery, it is referred to as a pulmonary embolism. An angina attack occurs during a partial blockage of the coronary arteries.
24. *Correct answer: c.* Hepatitis is inflammation of the liver, and that caused by certain viruses is referred to as hepatitis B, hepatitis C, etc. depending on the

infective organism involved. Up to 80% of primary liver cancers are due to infection with hepatitis B virus, and all clinical dental staff must be vaccinated against it before working in situations where they may come into contact with patients' blood. None of the other options listed are linked to hepatitis B.

25. *Correct answer: e.* Warfarin is an anticoagulant drug prescribed to patients who have suffered, or are likely to suffer from, detachment of a thrombus within the circulatory system. Dislodgement of the thrombus may cause a stroke or a pulmonary embolism, depending on its position in the body. These patients will be on long-term warfarin and therefore require their INR to be checked regularly to avoid bleeding problems. Patients who have survived a myocardial infarction tend to be prescribed numerous other drugs for life, rather than warfarin.
26. *Correct answer: a.* The foramen magnum is the large bony opening in the occipital bone of the cranium that allows the passage of the spinal cord into the vertebral column. The foramen ovale and foramen rotundum are smaller bony openings that allow passage of some cranial nerves, and the mandibular and mental foramina are bony openings in the mandible, associated with the inferior dental nerve.
27. *Correct answer: c.* Gastric reflux is a condition where the acidic contents of the stomach are effectively regurgitated into the oesophagus or the mouth. It is due to disorders such as a hiatus hernia. As the refluxed material is acidic, it will have a demineralising effect on the enamel of the teeth, especially the labial or palatal surfaces of the upper incisors. This specific type of tooth surface loss is called erosion. Attrition is tooth surface loss due to heavy grinding of the teeth, aphthous ulcers are oral soft tissue lesions often associated with diet and stress, glossitis is inflammation of the tongue, and xerostomia is the medical term for a dry mouth.
28. *Correct answer: c.* These patients will suffer from angina, and the classic symptom of this condition is chest pain that occurs in relation to exercise, exertion and stress. In contrast, the chest pain associated with a myocardial infarction is crushing, of sudden onset and not related to exertion nor relieved by resting. None of the other options listed are symptoms that occur with angina.
29. *Correct answer: c.* Diabetes is a medical condition associated with dysfunction of the islets of Langerhans cells in the pancreas, which normally produce insulin. Insulin is required by the body to remove glucose from the circulatory system and allow its metabolism by the body tissues. Although the complications associated with diabetes can affect several organs, they are the result of the condition rather than the cause of it.
30. *Correct answer: d.* Any medical disorder or physical disability that limits the movements and use of the hands, arms or wrists is likely to make oral hygiene techniques more difficult for the patient to achieve to a satisfactory

level. Plaque control is likely to be reduced in these patients, making them more prone to dental caries and periodontal disease. None of the other options listed are specific to the presence of osteoarthritis.

31. *Correct answer: b.* The salivary glands are all exocrine glands – they release their secretions (saliva) into the oral cavity through ducts rather than directly into the bloodstream. The gallbladder is a storage organ for bile, and it also releases its contents into the digestive tract through a duct.
32. *Correct answer: a.* Patients at risk of an intravascular clot (thrombus) either forming or dislodging will be prescribed the anticoagulant warfarin, and are likely to have additional bleeding problems during or following minor oral surgery. They would require to have their INR score taken and recorded just before any procedure was performed in order to avoid bleeding complications. Haemophiliacs are patients who suffer from clotting disorders anyway, and would need to be treated under hospital conditions for these types of procedures. Angina poses no additional risk with regard to bleeding complications during minor oral surgery procedures.
33. *Correct answer: e.* Thyroxine is a medication given to patients with an underactive thyroid gland, and is required to replace the normal thyroxine secretion of that gland. The drug increases the overall metabolic rate of the patient, and so if adrenaline-containing local anaesthetics are also given, the overall effect can be to increase the heart rate to dangerous levels. Consequently, these types of local anaesthetic are avoided in these cases. Local anaesthetics containing adrenaline are not contraindicated with any of the other medications in the options list.
34. *Correct answer: d.* Bronchial asthma is a relatively common condition that affects the smaller bronchioles of the lungs, which react in an abnormal way to external allergens that have been inhaled. The allergens stimulate a hypersensitivity response, and sufferers have particular difficulty with expiration during an asthma attack. The options listed occur in various other respiratory disorders, but not bronchial asthma.
35. *Correct answer: c.* Each artery has a layer of smooth muscle running along its length, but it also has a thick elastic layer that prevents backflow as the surge of blood travels from the heart to the body tissues and organs. The pulse of blood passes through the stretched artery, and then the recoil of the elastic layer closes the lumen of the vessel so that the blood only travels onwards. The muscle layer provides strength to the vessel and prevents its collapse.
36. *Correct answer: c.* Erythromycin is the accepted alternative antibiotic prescribed to patients with a penicillin allergy, as the two drugs have a similar spectrum of action against bacteria. Amoxicillin is a penicillin-based antibiotic and would not be safe for this patient, as it would also stimulate an allergic reaction. Aciclovir is an antiviral drug, nystatin is an antifungal drug, and paracetamol is an analgesic.

37. *Correct answer: a.* Glyceryl trinitrate is provided as a sublingual spray for self-administration by patients suffering from angina. It is also a required medical emergency drug to be kept on the premises in all dental workplaces, in the event of a patient suffering an angina attack at the surgery, for administration by a member of the dental team. The drug is not used for any of the other options listed.
38. *Correct answer: d.* The endothelial walls of capillaries are just one cell thick to allow the rapid transfer of molecules and gases across their surfaces. This transfer occurs from the bloodstream into the surrounding tissues, as well as in the opposite direction. None of the other options listed are features of these microscopic vessels.
39. *Correct answer: e.* The superior vena cava and inferior vena cava are the large venous blood vessels that return deoxygenated blood from the whole body to the right atrium of the heart. The superior vessel transports blood from the upper areas of the body, and the inferior vessel from the lower areas of the body. The collected deoxygenated blood is transported from the heart to the lungs in the pulmonary artery, where it is reoxygenated. This then travels from the lungs to the left atrium via the pulmonary vein, and then out to the body tissues via the aorta.
40. *Correct answer: a.* Aspirin has anticoagulant properties and would likely cause bleeding complications if taken after a surgical procedure. Any of the other options listed would be suitable analgesics to be recommended to the patient as alternatives in these circumstances.
41. *Correct answer: e.* Patients with valvular heart disease have, by definition, either damaged heart valves or prosthetic replacements for them. The presence of either makes the heart valves more likely to allow their colonisation by bacteria present in the circulatory system (bacteraemia), as occurs after dental procedures such as endodontics. The patient could then develop the condition of bacterial endocarditis, which may be life-threatening. Consequently, these patients tend to be unsuitable for dental procedures where a bacteraemia may develop, such as root canal therapy. None of the other options listed are medical conditions that contraindicate this dental treatment.
42. *Correct answer: b.* The reduced peripheral circulation associated with diabetes leads to an increased predisposition to infections and poor wound healing, due to the inability to transport sufficient leucocytes to a diseased area and to initiate an adequate immune response. Consequently, diabetics tend to be more prone to periodontal destruction and localised oral infections, such as a dry socket. None of the other listed medical conditions will particularly affect the oral cavity.
43. *Correct answer: a.* Erythrocytes are the red blood cells responsible for the transport of oxygen around the body, and as with all other blood cells (except some lymphocytes) they are manufactured in the bone marrow. Of the options

listed, only the spleen represents another structure involved with blood cell production, as it is responsible for the manufacture of some lymphocytes.

44. *Correct answer: a.* Rings of cartilage circle the trachea and prevent its collapse during inhalation and expiration. The rings also extend into the two bronchi, and have the same purpose here. All the other options listed are features of other areas of the respiratory tract, but not the trachea.

Extended matching questions

General anatomy and physiology

1. *Correct answer: j.* The stomach produces this enzyme in its inactive form of pepsinogen, which is then converted to pepsin that acts to aid the digestion of proteins.
2. *Correct answer: a.* The red blood cells – erythrocytes – are responsible for the transport of oxygen around the body, and like the majority of blood cells they are made in the bone marrow.
3. *Correct answer: h.* Although the stomach is responsible for breaking up the food that is swallowed, by its churning actions and release of hydrochloric acid that chemically breaks food into smaller particles, the vast majority of the actual digestion of nutrients occurs in the small intestine. Its long length and extensive blood supply allow hours of digestive action and nutrient absorption to occur before the food mass passes into the large intestine.
4. *Correct answer: e.* The liver is the largest organ in the body and has many functions besides the detoxification of drugs. It is the main organ responsible for this important role, and any disease process affecting the functioning of the liver is likely to result in the sufferer becoming very seriously ill, as poisons and toxins accumulate in their body.
5. *Correct answer: g.* The pancreas is one of the accessory organs of the digestive system, like the liver. It is essentially a glandular organ, and is responsible for the production and release of the hormones insulin and glucagon, which act together to control blood sugar levels.

Medical conditions

1. *Correct answer: c.* Although a common disorder in smokers, chronic bronchitis also occurs in non-smokers who have lived extensively in areas of high atmospheric pollution. This pollution is linked to heavily industrialised areas, as occurs in large cities.
2. *Correct answer: j.* A stroke occurs when a cranial blood vessel suddenly becomes blocked by a blood clot, causing the area of brain tissue it supplies to die. If a casualty survives, the anticoagulant drug warfarin is given to prevent

further clot formation. Other medical conditions involving the use of warfarin in this way are deep vein thrombosis, pulmonary embolism and, in the short term, myocardial infarction.

3. *Correct answer: h.* Hypertension is a medical condition where the sufferer's blood pressure is persistently raised above normal levels (around 120/80 mmHg in healthy adults). The higher pressure means that the heart has to work harder to pump blood effectively around the body, and this will gradually cause damage to the heart. Another risk factor of hypertension is stress.
4. *Correct answer: g.* Non-steroidal anti-inflammatory drugs (NSAIDs) are very useful medications for short-term use to ease a variety of problems, but they should not be taken over a long time because of their erosive effect on the stomach lining. In some cases, overuse of NSAIDs causes erosion through the stomach lining and leads to the formation of a gastric ulcer. Sufferers may then require further medication to treat the indigestion-type symptoms that this condition produces.
5. *Correct answer: e.* The pancreas produces the hormones insulin and glucagon, which act together in a healthy person to control blood glucose levels throughout life. Dysfunction of cells within the pancreas results in a lack of insulin production, and the patient develops diabetes. It is quite common for several members of a family to be diabetics.

2

Oral Anatomy and Physiology

Multiple choice questions

1. The teeth of both jaws are held in bony sockets by their periodontal ligaments. Which one of the following bones forms the sockets?
 - (a) Alveolar process
 - (b) Coronoid process
 - (c) Mandible
 - (d) Maxilla
 - (e) Ramus
2. Saliva is the watery fluid secreted by the salivary glands that is naturally present in the healthy oral cavity. Which one of the following main constituents of saliva acts as a buffering agent?
 - (a) Enzymes
 - (b) Immunoglobulins
 - (c) Inorganic ions
 - (d) Leucocytes
 - (e) Water
3. A patient re-attends the surgery after previously undergoing the surgical removal of the lower right third molar tooth. He complains of a 'numb' sensation in the anterior two-thirds of the right side of his tongue. Which one of the following nerves is most likely to have been damaged during the surgical procedure?
 - (a) Facial nerve
 - (b) Inferior dental nerve
 - (c) Lingual nerve
 - (d) Long buccal nerve
 - (e) Mental nerve

4. The four pairs of muscles of mastication are responsible for effecting jaw movement and mouth closure during chewing. Which one of the following is the most powerful of these muscles during mastication?
 - (a) Lateral pterygoid
 - (b) Masseter
 - (c) Medial pterygoid
 - (d) Orbicularis oris
 - (e) Temporalis
5. The head and neck region are innervated by the 12 pairs of cranial nerves. Many of these nerves carry both motor and sensory nerve fibres, so they transmit messages to the brain for interpretation and action messages from the brain to the muscles. Which one of the following nerves transmits taste sensation from the anterior two-thirds of the tongue?
 - (a) Facial nerve
 - (b) Glossopharyngeal nerve
 - (c) Hypoglossal nerve
 - (d) Mandibular nerve
 - (e) Maxillary nerve
6. The lower first permanent molar teeth are amongst the first of the secondary dentition to erupt. Which one of the following options states the correct arrangement of their roots in the mandible?
 - (a) Buccal and lingual
 - (b) Lingual, mesiobuccal and distobuccal
 - (c) Mesial and distal
 - (d) Palatal and buccal
 - (e) Palatal, mesiobuccal and distobuccal
7. A 60-year-old patient attends the surgery for the simple extraction of the lower right second premolar tooth, which is periodontally involved and mobile. To ensure the procedure is carried out painlessly, the dentist must anaesthetise which pair of the following combinations of nerves?
 - (a) Inferior dental and long buccal nerves
 - (b) Inferior dental and mental nerves
 - (c) Lingual and long buccal nerves
 - (d) Lingual and mental nerves
 - (e) Long buccal and mental nerves
8. The skull is the anatomical term for the head and can be divided into three regions: the cranium, the face, and the jaws. The cranium is made up of bony plates that lock together at the coronoid sutures. Which one of the following bony plates forms the base of the posterior part of the cranium?
 - (a) Frontal bone
 - (b) Occipital bone

- (c) Parietal bone
 - (d) Sphenoid bone
 - (e) Temporal bone
9. The alveolar bone, gingiva, and periodontal ligament are together known as the supporting structures of the teeth. The periodontal ligament itself is composed of a protein called collagen, which gives the structure strength and resistance to tearing during mastication. Which one of the following cell types is responsible for the formation of collagen?
- (a) Ameloblasts
 - (b) Chondroblasts
 - (c) Fibroblasts
 - (d) Odontoblasts
 - (e) Osteoblasts
10. Dentine is the calcified tissue that forms the bulk of the tooth, and lies beneath the enamel and cementum. Which one of the following cell types forms dentine?
- (a) Ameloblast
 - (b) Chondroblast
 - (c) Fibroblast
 - (d) Odontoblast
 - (e) Osteoblast
11. The four pairs of muscles of mastication are responsible for effecting jaw movements and jaw closure during chewing. Which one of the following muscles contracts to allow the movement of the jaw from side to side?
- (a) Buccinator
 - (b) Lateral pterygoid
 - (c) Masseter
 - (d) Medial pterygoid
 - (e) Temporalis
12. A 39-year-old patient attends the surgery for the extraction of the upper right canine tooth, which is labially placed and now periodontally involved. To ensure the tooth is extracted painlessly, the dentist must anaesthetise which pair of the following combinations of nerves?
- (a) Anterior superior dental and greater palatine nerves
 - (b) Anterior superior dental and long buccal nerves
 - (c) Anterior superior dental and nasopalatine nerves
 - (d) Middle superior dental and greater palatine nerves
 - (e) Middle superior dental and nasopalatine nerves
13. The lateral incisor teeth are the smallest in each dental arch. Some patients exhibit a congenital absence of these teeth in the upper arch, but in those

individuals with a full dentition the upper lateral incisors normally erupt at a known average age. Which one of the following is the most likely average age of eruption?

- (a) 6–7 years
- (b) 7–8 years
- (c) 8–9 years
- (d) 9–11 years
- (e) 12–13 years

14. The mandible forms the horseshoe-shaped lower jaw of the oral cavity, and articulates with the temporal bone of the skull at a certain anatomical structure to form the temporomandibular joint. Which one of the following options is the most likely name of this anatomical structure?

- (a) Body
- (b) Condyle
- (c) Lingula
- (d) Ramus
- (e) Symphysis

15. The four pairs of muscles of mastication are responsible for the sideways and forwards movements of the lower jaw, as well as mouth closure during chewing movements and speech. Which one of the following nerves has a motor branch that provides their innervation?

- (a) Facial
- (b) Glossopharyngeal
- (c) Hypoglossal
- (d) Mandibular
- (e) Maxillary

16. Swallowing is a complex muscular action which aims to direct chewed food into the oesophagus and then the stomach, where the process of digestion can continue. The food bolus is prevented from passing into the nasal cavity during swallowing by the action of which one of the following anatomical structures?

- (a) Epiglottis
- (b) Soft palate
- (c) Tongue
- (d) Tonsils
- (e) Uvula

17. Saliva is the watery secretion formed by the three pairs of major salivary glands and the minor salivary glands, which are dotted around the oral cavity. They are examples of exocrine glands, and the largest of all secretes its contents into the oral cavity by which one of the following methods?

- (a) Through its walls into the blood
- (b) Through its walls into the tissues

- (c) Through Stenson's duct
 - (d) Through sublingual ducts
 - (e) Through Wharton's duct
18. The inferior dental nerve supplies the lower teeth and their buccal and labial supporting structures, and enters the mandible at the mandibular foramen. Which one of the following anatomical structures protects the nerve from damage before it enters the mandible?
- (a) Body
 - (b) Condyle
 - (c) Lingula
 - (d) Ramus
 - (e) Symphysis
19. A 17-year-old patient attends for the restoration of the lower left first molar tooth, by the preparation and placement of a full gold crown onto the tooth. As the tooth is fractured buccally, a crown lengthening procedure will also be carried out at the preparation stage. To ensure this first stage of the restorative procedure is carried out painlessly, the dentist must anaesthetise which pair of the following combinations of nerves?
- (a) Inferior dental and lingual nerves
 - (b) Inferior dental and long buccal nerves
 - (c) Lingual and long buccal nerves
 - (d) Long buccal and mental nerves
 - (e) Mental and lingual nerves
20. The upper second molar teeth are usually the last of the secondary dentition to erupt, barring the third molars or 'wisdom teeth'. Their roots are arranged in the maxilla according to which one of the following options?
- (a) Buccal and lingual
 - (b) Lingual, mesiobuccal and distobuccal
 - (c) Mesial and distal
 - (d) Palatal and buccal
 - (e) Palatal, mesiobuccal and distobuccal
21. Enamel is the calcified tissue that covers the crown of the tooth. It is composed of hydroxyapatite crystals in a prism arrangement, and is formed before birth. Which one of the following cell types is responsible for its formation?
- (a) Ameloblast
 - (b) Chondroblast
 - (c) Fibroblast
 - (d) Odontoblast
 - (e) Osteoblast
22. The mandible is the horseshoe-shaped bone forming the lower jaw. It is actually composed of two bones that have fused together in early life, giving

the resultant rigid structure. Which one of the following is the anatomical reference for the point at which the two bones fuse together?

- (a) Genial tubercles
 - (b) Mental symphysis
 - (c) Mylohyoid ridge
 - (d) Ramus
 - (e) Sigmoid notch
23. A 46-year-old kidney transplant patient attends for the removal of hyperplastic gingivae overlying the upper right molar teeth. To ensure the procedure is carried out painlessly, the dentist must anaesthetise which pair of the following combinations of nerves?
- (a) Greater palatine and middle superior dental nerves
 - (b) Middle and anterior superior dental nerves
 - (c) Middle and posterior superior dental nerves
 - (d) Nasopalatine and middle superior dental nerves
 - (e) Posterior superior dental and greater palatine nerves
24. The trigeminal nerve is the fifth cranial nerve, and supplies the majority of the oral cavity. A branch of the mandibular division runs from the inner surface of the ramus of the mandible and then over the external oblique ridge to supply the surrounding gingivae. What is the name of this branch?
- (a) Incisive nerve
 - (b) Inferior dental nerve
 - (c) Lingual nerve
 - (d) Long buccal nerve
 - (e) Mental nerve
25. The deciduous molar teeth of the primary dentition are succeeded by the premolar teeth of the secondary dentition. Although some patients exhibit wide variations in the age at which some teeth erupt, there is usually an average age at which the first premolars do so. Which one of the following is the most likely average age?
- (a) 6–7 years
 - (b) 7–8 years
 - (c) 8–9 years
 - (d) 9–11 years
 - (e) 12–13 years
26. The nasal cavity forms part of the facial portion of the skull, and is the main structure through which air is inspired and expired during respiration. Its internal bone structure is specially adapted to ensure that inspired air is warmed, by passing over the rich capillary beds lining which one of the following?
- (a) Antrum
 - (b) Ethmoid bone

- (c) Hard palate
 - (d) Septum
 - (e) Turbinates
27. The oral cavity is surrounded by many muscles, which act to allow jaw opening, jaw closing and facial expressions. Which one of the following muscles, which has its point of insertion on the coronoid process, is responsible for jaw closing?
- (a) Buccinator
 - (b) Digastric
 - (c) Lateral pterygoid
 - (d) Orbicularis oris
 - (e) Temporalis
28. The head and neck region are innervated by the 12 pairs of cranial nerves. Many of these nerves carry both motor and sensory nerve fibres, so they transmit messages to the brain for interpretation and action messages from the brain to the muscles. Which one of the following nerves transmits messages to the parotid salivary glands, to effect its secretory action?
- (a) Facial nerve
 - (b) Glossopharyngeal nerve
 - (c) Hypoglossal nerve
 - (d) Mandibular nerve
 - (e) Maxillary nerve
29. The anterior superior dental nerve is a branch of the maxillary division of the trigeminal nerve (fifth cranial nerve). It supplies sensation to the upper anterior teeth and their supporting structures, and enters the skull through which one of the following foramina?
- (a) Apical foramen
 - (b) Incisive foramen
 - (c) Infraorbital foramen
 - (d) Mandibular foramen
 - (e) Mental foramen
30. The oral cavity is surrounded by many muscles, which act to allow jaw opening, jaw closing and facial expressions. Which one of the following muscles, which has its point of origin on the outer surface of the zygomatic arch, is responsible for jaw closing?
- (a) Buccinator
 - (b) Lateral pterygoid
 - (c) Masseter
 - (d) Medial pterygoid
 - (e) Suprahyoid

31. All teeth are composed of an inner bulk of dentine, covered by enamel over the crown and by cementum over the root. The hollow centre of each tooth and its root(s) is the pulp chamber, which contains the neurovascular tissue making up the pulp. Which one of the following covers the point at which the enamel and cementum normally meet?
- (a) Amelodentinal junction
 - (b) Gingival crevice
 - (c) Junctional epithelium
 - (d) Lamina dura
 - (e) Periodontal ligament
32. Saliva is the watery secretion formed mainly by the three pairs of major salivary glands: the parotid glands, the submandibular glands, and the sublingual glands. Two pairs of these glands lie in the floor of the mouth, in close proximity to the tongue. They are separated from each other anatomically by which one of the following muscles?
- (a) Digastric
 - (b) Genioglossus
 - (c) Geniohyoid
 - (d) Hyoglossus
 - (e) Mylohyoid

Extended matching questions

Oral anatomy and physiology

For each of the following oral anatomy and physiology questions, select the single most appropriate anatomical structure from the option list. Each option might be used once, more than once, or not at all.

- (a) Condylar head
- (b) Facial nerve
- (c) Frontal bone
- (d) Hyoid bone
- (e) Hypoglossal nerve
- (f) Lateral pterygoid muscle
- (g) Lingual nerve
- (h) Mylohyoid muscle
- (i) Sphenoid bone
- (j) Temporalis muscle

1. The skull is composed of three anatomical regions: the cranium, the face and the jaws. The cranium is the region that houses the brain, and is made up of several bony plates that lock together at the coronoid sutures. Which one of the options listed is the anatomical structure that forms the front section of the base of the cranium?

2. The muscles surrounding the head and neck region fall into one of three groups: the muscles of mastication, the muscles of facial expression, and the suprahyoid muscles. Each group has several individual muscle pairs that effect various movements, and each group also has its own nerve supplies. Which one of the options listed is the anatomical structure that forms the floor of the mouth?
3. The temporomandibular joint is the hinge-type joint that allows the mouth to open and close. It is formed between the temporal bone of the cranium and the mandible, which is the lower jaw. The two bony areas are separated from each other by a cartilage pad called the meniscus. Which one of the options listed is the anatomical structure that forms the mandibular component of the joint?
4. The muscles surrounding the head and neck region fall into one of three groups: the muscles of mastication, the muscles of facial expression, and the suprahyoid muscles. Each group has several individual muscle pairs that effect various movements, and each group also has its own nerve supplies. Which one of the options listed is the anatomical structure that sends electrical impulses to the muscles of facial expression?

Nerve supply

For each of the following nerve supply questions, select the single most appropriate nerve from the option list. Each option might be used once, more than once, or not at all.

- (a) Anterior superior dental
 - (b) Facial
 - (c) Glossopharyngeal
 - (d) Greater palatine
 - (e) Inferior dental
 - (f) Lingual
 - (g) Long buccal
 - (h) Mandibular
 - (i) Nasopalatine
 - (j) Trigeminal
1. The head and neck region is supplied by 12 pairs of cranial nerves, which exit the cranium directly from the brain rather than from the spinal cord. Between them, they are responsible for transmitting all sensation from this region to the brain, and supplying impulses to all the muscles from the brain. Which one of the options listed is the nerve that transmits taste sensation from the back of the tongue?
 2. The mandible is supplied by a division of the fifth cranial nerve, and has both sensory and motor branches. The motor branches supply the muscles of

mastication, to allow jaw closure and chewing movements. The sensory branches transmit sensation from the lower teeth and their surrounding structures to the brain, and are the nerves that require anaesthetising by the dentist when carrying out dental treatment in the mandibular region. Which one of the options listed is the nerve that supplies sensation from the lower molar buccal gingivae?

3. The maxilla is supplied by a division of the fifth cranial nerve, and has just sensory branches which transmit sensation from the upper teeth and their surrounding structures. These are the nerves that require anaesthetising by the dentist when carrying out dental treatment in the maxillary region. Which one of the options listed is the nerve that transmits sensation from the palatal gingivae of the anterior teeth?
4. The head and neck region is supplied by twelve pairs of cranial nerves, which exit the cranium directly from the brain, rather than from the spinal cord. Between them, they are responsible for transmitting all of the sensation from this region to the brain, and supplying impulses to all of the muscles from the brain. Which one of the options listed is the nerve that supplies the majority of the structures in the oral cavity?
5. The mandible is supplied by a division of the fifth cranial nerve, and has both sensory branches and motor branches. The motor branches supply the muscles of mastication, to allow jaw closure and chewing movements to occur. The sensory branches transmit sensation from the lower teeth and their surrounding structures to the brain, and are the nerves that require anaesthetising by the dentist when carrying out dental treatment in the mandibular region. Which one of the options listed is the nerve that supplies sensation from the lower teeth?

Answers

Multiple choice questions

1. *Correct answer: a.* The alveolar processes are the extensions of the base bones of the mandible and maxilla, where the teeth form in the embryo. When teeth are extracted, the alveolar process gradually resorbs until just the base bones of the jaws remain. All the other options listed are anatomical features of the mandible or maxilla.
2. *Correct answer: c.* The inorganic ions present in saliva are responsible for neutralising the acidic environment produced by oral bacteria as they digest food particles present in the mouth following food intake. This neutralisation to normal pH7 is called buffering, and is responsible for reducing the dental damage caused by caries. All the other options listed are salivary constituents with other functions.
3. *Correct answer: c.* As its name suggests, the lingual nerve supplies sensation from the anterior two-thirds of the tongue, and is a sensory branch of the mandibular division of the trigeminal nerve. The inferior dental, long buccal and mental nerves are also sensory branches of the mandibular nerve. The facial nerve is cranial nerve VII.
4. *Correct answer: b.* The masseter muscle runs from the zygomatic arch to the angle and ramus of the mandible, and can be seen to bunch at the sides of the face when the teeth are clamped together. It produces the most powerful of the closing actions of the mandible, and provides a strong biting movement. The pterygoids and the temporalis are the other, less powerful, muscles of mastication. The orbicularis oris is a muscle of facial expression, and forms the ring of muscle around the oral aperture.
5. *Correct answer: a.* The facial nerve has both motor and sensory components, the former to innervate the muscles of facial expression and the latter to provide taste sensation for the anterior two-thirds of the tongue. The glossopharyngeal nerve supplies taste for the posterior third of the tongue, while the hypoglossal nerve innervates the majority of the muscles of the tongue. The mandibular and maxillary nerves are branches of the trigeminal nerve.
6. *Correct answer: c.* The lower molar teeth have just two roots, and they are arranged along the dental arch (mesial and distal) rather than across the arch (buccal and lingual). Palatal roots are a feature of upper teeth, rather than lower teeth.
7. *Correct answer: d.* Both the tooth itself and the surrounding gingivae need to be fully anaesthetised for an extraction procedure to be carried out painlessly. The lower premolar teeth and their buccal gingivae can be anaesthetised either by an inferior dental block injection or a mental block injection. The lingual gingivae can be anaesthetised using a lingual infiltration technique. The long buccal nerve supplies the buccal gingivae of the lower molar teeth only.

8. *Correct answer: b.* The occipital bone forms the base of the posterior part of the cranium, while the anterior base is formed by the sphenoid bone. The frontal, parietal and temporal bones form the front and sides of the cranium.
9. *Correct answer: c.* The periodontal ligament is composed of fibres of the protein collagen, a type of connective tissue that includes fibrous tissue, cartilage, bone, blood cells and the dentine of teeth. The specific cells that form fibrous tissue are fibroblasts, those that form cartilage are chondroblasts, those that form bone are osteoblasts, and those that form dentine are odontoblasts. Ameloblasts are the cells that form the enamel of the teeth.
10. *Correct answer: d.* Dentine is a type of connective tissue and is formed by odontoblasts. See also the answer to question 9.
11. *Correct answer: b.* The pair of lateral pterygoid muscles can contract independently from each other, so that the contraction of one muscle will cause the mandible to swing towards the opposite side. When they contract together, they pull the mandible forwards so that the teeth can bite in a tip-to-tip position. None of the other pairs of muscles of mastication can contract independently. The buccinator is a muscle of facial expression and forms the cheek.
12. *Correct answer: c.* Both the tooth itself and the surrounding gingivae need to be fully anaesthetised for an extraction procedure to be carried out painlessly. The upper canine tooth and its labial gingiva is supplied by the anterior superior dental nerve, and the palatal gingiva of the tooth is supplied by the nasopalatine nerve.
13. *Correct answer: c.* The upper lateral incisors erupt last of all of the incisor teeth, normally at the average age of 8–9 years. The canines, premolars and second molar teeth erupt afterwards.
14. *Correct answer: b.* The head of the condyle of the mandible sits in the glenoid fossa of the temporal bone to form the temporomandibular joint. All the other options listed are anatomical points on the mandible, but do not form any part of the temporomandibular joint.
15. *Correct answer: d.* The mandibular nerve is a division of the trigeminal nerve which supplies the lower jaw, and its motor branch innervates the muscles of mastication. The maxillary nerve is the division of the trigeminal that supplies the upper jaw, with no motor component, and the other three options listed are cranial nerves VII, IX and XII respectively.
16. *Correct answer: b.* During the act of swallowing, the soft palate is raised up to seal off the nasal cavity opening at the back of the oral cavity, thus preventing any part of the food bolus from entering the nasal passages. The epiglottis is the cartilaginous flap that falls across the trachea to prevent food inhalation during swallowing, and the tongue guides the food bolus backwards to allow swallowing to occur. The tonsils and uvula are other anatomical structures of the oral cavity, but play no part in swallowing.
17. *Correct answer: c.* The major salivary glands are examples of exocrine glands and secrete their contents into the oral cavity via ducts. Stenson's duct runs from

the largest salivary glands, the parotids, into the oral cavity, while the submandibular glands secrete via Wharton's ducts, and the sublingual glands via numerous sublingual ducts.

18. *Correct answer: c.* The lingula is a spur of bone projecting over the mandibular foramen on the inner aspect of the ramus of the mandible. It prevents the piercing of the nerve by the needle during the inferior dental nerve block technique of local anaesthesia. The other options listed are all various anatomical features of the mandible which have no relevance to the inferior dental nerve.
19. *Correct answer: b.* Both the tooth and its buccal gingiva must be anaesthetised for this procedure to be carried out painlessly. The molar teeth are supplied by the inferior dental nerve, and their buccal gingivae by the long buccal nerve. The lingual gingiva of the tooth does not require anaesthetising in this case, as the crown lengthening procedure will not involve the lingual side of the tooth.
20. *Correct answer: e.* All the upper molar teeth have three roots, and they are arranged as a tripod in the dental arch, one palatally and two buccally as described.
21. *Correct answer: a.* Ameloblasts are the cells responsible for the laying down of enamel over the embryonic tooth germ structure while the embryo is developing in the first weeks of life. All the other options listed are cells responsible for the formation of various types of connective tissue.
22. *Correct answer: b.* The mental symphysis lies at the midpoint of the horseshoe-shaped mandible, in the region of the chin. Anatomically, it is a joint between the two halves of the bone and fuses in the first year of life. All the other options listed are anatomical features of the mandible, but none are associated with this joint structure.
23. *Correct answer: c.* Drug-induced gingival hyperplasia tends to affect the buccal and/or labial gingivae of the teeth. In this case, as all the upper molar teeth are involved, both the middle and posterior branches of the superior dental nerve require anaesthetising, as the first molar tooth is supplied by both. The greater palatine and nasopalatine nerves supply the palatal gingivae of the upper teeth.
24. *Correct answer: d.* This describes the passage of the long buccal nerve, the branch of the mandibular nerve that runs outside the mandible and supplies the buccal gingivae of the lower molar teeth. The incisive nerve supplies areas of the maxilla, while all the other options listed are branches of the mandibular nerve that supply other areas of the oral cavity.
25. *Correct answer: d.* The premolar teeth begin erupting at around 9 years of age, although the upper second premolars usually start a little later. Only the second molar teeth erupt between the ages of 12 and 13 years.
26. *Correct answer: e.* The turbinate bones of the nasal cavity form a large, highly vascularised surface area for inspired air to pass over before it travels deeper into the respiratory tract. This allows the air to be warmed and therefore

be less irritant to the delicate respiratory tract lining. All the other options listed are bony structures within the vicinity of the nasal cavity, but have no role to play in this particular function.

27. *Correct answer: e.* The muscles responsible for jaw closing are those of mastication, of which only the lateral pterygoid and temporalis are options listed. The lateral pterygoid muscles run between the lateral pterygoid plates and the heads of condyle of the mandible, and do not attach to the coronoid process. Buccinator and orbicularis oris are muscles of facial expression, while digastric is one of the suprahyoid muscles.
28. *Correct answer: b.* Although the facial nerve runs through the structure of the parotid salivary gland, it does not supply it, only the other two major salivary glands. The glossopharyngeal nerve is responsible for the secretory action of the largest salivary gland. None of the other three options listed have any effect on the secretory actions of the three major salivary glands.
29. *Correct answer: c.* The anterior superior dental nerve is one of the end branches of the infraorbital nerve, and joins this larger nerve once it enters the skull through the infraorbital foramen. The apical foramen is found at the end of the root of a tooth. The other three options listed have no bearing on the anterior superior dental nerve.
30. *Correct answer: c.* The masseter is the most powerful of the muscles of mastication, and runs from the outer surface of the zygomatic arch to the angle and ramus of the mandible. Its position is mirrored on the inner surface of the zygomatic arch by the medial pterygoid muscle. The other three options listed have no involvement with this anatomical feature.
31. *Correct answer: c.* The enamel and cementum normally meet at the neck of the tooth, and in a healthy periodontium this point is covered by the tight cuff of specialised gingival tissue called the junctional epithelium. Where advanced periodontal disease is present, the junctional epithelium will have been destroyed by the disease process.
32. *Correct answer: e.* The mylohyoid muscle forms the floor of the mouth, and the sublingual glands and the submandibular glands lie above and below it, respectively. The digastric muscle lies lower still in the tissues of the throat, while the other three options listed are all muscles of the tongue itself.

Extended matching questions

Oral anatomy and physiology

1. *Correct answer: i.* The sphenoid bone lies behind the facial portion of the skull, and connects it to the cranium at the front part of its base. The occipital bone forms the back portion of the cranium.

2. *Correct answer: h.* The mylohyoid muscle is one of the suprahyoid group of muscles, and is connected along the inner surface of the mandible at the mylohyoid ridge. Its other end is attached to the hyoid bone in the throat. The tongue and sublingual salivary glands lie above the muscle in the mouth, and the submandibular salivary glands lie below it.
3. *Correct answer: a.* The condylar head of the mandible sits in the glenoid fossa of the temporal bone to form the temporomandibular joint. The head is shaped to allow simple hinge movements that open and close the mouth, as well as allowing rotation movements that swing the mandible from side to side.
4. *Correct answer: b.* The facial nerve is the seventh cranial nerve, and its motor component transmits messages to the muscles of facial expression to allow their movement. Its sensory component transmits taste sensation from the front part of the tongue to the brain, as well as stimulating saliva flow in the sublingual and submandibular salivary glands.

Nerve supply

1. *Correct answer: c.* The glossopharyngeal nerve is the ninth cranial nerve, supplying many of the muscles involved in the act of swallowing and stimulating saliva flow from the parotid glands.
2. *Correct answer: g.* The long buccal nerve leaves the mandibular trunk outside the ramus of the mandible, and crosses the dental arch behind the last standing molar teeth. It runs over the external oblique ridge and lies in the buccal sulcus region, adjacent to the lower molars. It supplies the buccal gingivae of these teeth and their supporting structures.
3. *Correct answer: i.* The nasopalatine nerve runs along the floor of the maxillary antrum and exits onto the front section of the palate through the incisive foramen. It supplies the palatal gingivae of the upper incisors and canine teeth, and their associated supporting structures. The nerve was known previously as the long sphenopalatine nerve.
4. *Correct answer: j.* The trigeminal nerve is the fifth cranial nerve, and has the most importance to dentistry and the dental team. It has three divisions: the ophthalmic, the maxillary and the mandibular. The latter two supply all the teeth and their supporting structures, and the majority of the mucous membrane covering of the oral soft tissues. Its motor component supplies the muscles of mastication.
5. *Correct answer: e.* The inferior dental nerve leaves the mandibular trunk and enters the mandible through the mandibular foramen. It runs inside the body of the mandible and then exits again through the mental foramen, supplying all the lower teeth along its course. From the mental foramen, which lies between the roots of the lower premolar teeth, the nerve also supplies the buccal and labial gingivae of the anterior teeth and their supporting structures.

3

Dental Pathology and Microbiology

Multiple choice questions

1. While giving oral health dietary advice, the clinician is likely to recommend that a patient avoids excessive consumption of which one of the following in order to reduce the occurrence of enamel demineralisation?
 - (a) Ascorbic acid
 - (b) Citric acid
 - (c) Lactic acid
 - (d) Phosphoric acid
 - (e) Sulphuric acid

2. A teenage girl has completed a diet sheet after two cavities were discovered at her routine examination. Which one of the following products is identified as a source of non-milk extrinsic sugar in her diet?
 - (a) Apple juice
 - (b) Plain yoghurt
 - (c) Potatoes
 - (d) Strawberries
 - (e) Sweetcorn

3. During a dental examination, the clinician discovers an area of early enamel demineralisation on the lower left first molar tooth. Which one of the following is the most likely presentation of this area?
 - (a) Cavity
 - (b) Periapical abscess
 - (c) Reversible pulpitis
 - (d) Root caries
 - (e) White spot lesion

4. A tooth is normally composed of three types of calcified tissue surrounding the pulp chamber. Which one of the following tissues forms the bulk of both the crown and the root?
 - (a) Collagen fibres
 - (b) Fibrils
 - (c) Hollow tubes
 - (d) Inorganic prisms
 - (e) Intercellular substance
5. There are many different types of bacteria normally present in the oral cavity. Which one of the following organisms is most likely to be associated with the onset of dental caries?
 - (a) *Actinomyces*
 - (b) *Bacteroides*
 - (c) *Lactobacillus*
 - (d) *Staphylococcus*
 - (e) *Streptococcus*
6. A patient attends for an examination complaining of a sore tongue, and the dentist diagnoses xerostomia. This is more likely to be seen in patients taking which one of the following medications?
 - (a) Analgesics
 - (b) Antihistamines
 - (c) Bisphosphonates
 - (d) Diuretics
 - (e) Hormone replacement
7. Periodontal disease can be exacerbated by many medical factors. Which one of the following conditions is not directly linked to the severity of periodontal disease?
 - (a) Asthma
 - (b) Diabetes
 - (c) Leukaemia
 - (d) Stress
 - (e) Vitamin C deficiency
8. An elderly edentulous patient has recently had a set of full acrylic dentures provided. He returns to the surgery 6 weeks later complaining of a white patch on his palate, which is sore when touched. Which one of the following microorganisms is most likely to have caused this condition?
 - (a) *Actinomyces*
 - (b) *Bacillus fusiformis*
 - (c) *Candida albicans*
 - (d) Herpes simplex
 - (e) *Staphylococcus aureus*

9. The pH scale is a measure of the acidity or alkalinity of a solution, with pH 1 being the most acidic, pH 14 the most alkaline and pH 7 being neutral. Which one of the following is the usual pH value in the oral cavity several hours after food consumption?
- (a) 4.5
 - (b) 5.0
 - (c) 5.5
 - (d) 7.0
 - (e) 8.5
10. Saliva is the watery fluid secreted by the salivary glands that is naturally present in the healthy oral cavity. Which one of the following constituents of saliva is involved in calculus formation?
- (a) Enzymes
 - (b) Immunoglobulins
 - (c) Inorganic ions
 - (d) Leucocytes
 - (e) Water
11. A 19-year-old patient attends the surgery as an emergency, with severe oral pain, halitosis and ulcerated gingivae. The dentist diagnoses a specific oral infection. Which one of the following microorganisms is most likely to be involved?
- (a) *Actinomyces*
 - (b) *Borrelia vincenti*
 - (c) *Candida albicans*
 - (d) Herpes simplex
 - (e) *Lactobacillus*
12. A mother attends to seek advice on the necessity of fluoride drops for her young child. The dentist advises that it is not required because the region has a fluoridated water supply. Which one of the following is the most likely concentration of fluoride that has been added to the water supply?
- (a) 0.01 ppm
 - (b) 0.1 ppm
 - (c) 1 ppm
 - (d) 10 ppm
 - (e) 100 ppm
13. On examination of a patient, the dentist notices supragingival calculus forming at the lingual margins of the lower incisors. Which one of the following instruments would you set out in order for this to be removed?
- (a) Bristle brush
 - (b) Curette
 - (c) Cushing scaler

- (d) Hoe
 - (e) Sickle scaler
14. Many diseases are due to infection with a particular microorganism. Which one of the following is an example of an infection not caused by a microorganism?
- (a) Creutzfeldt–Jakob disease
 - (b) Hepatitis C
 - (c) Meningitis
 - (d) Poliomyelitis
 - (e) Swine influenza
15. A 45-year-old male patient attends the surgery for a routine dental examination. The dentist identifies tooth surface wear and faceting on the upper and lower incisors, caused by bruxism. Which one of the following is the correct definition for this type of tooth surface loss?
- (a) Abfraction
 - (b) Abrasion
 - (c) Attrition
 - (d) Caries
 - (e) Erosion
16. Various microorganisms can infect the body, causing diseases. Which one of the following describes a microorganism in its non-infective state?
- (a) Bacterium
 - (b) Fungus
 - (c) Protozoan
 - (d) Spore
 - (e) Virus
17. The presence and build-up of dental plaque is directly related to the incidence of dental diseases. That associated with periodontitis is specifically found in which one of the following?
- (a) Fissures
 - (b) Gingival crevice
 - (c) Interproximal areas
 - (d) Occlusal pits
 - (e) True pockets
18. Oral cancer is a serious, often fatal, condition that has been linked to tobacco use and high alcohol intake. Which one of the following is the most likely manifestation of this condition?
- (a) Basal cell carcinoma
 - (b) Lymphoma
 - (c) Melanoma
 - (d) Osteosarcoma
 - (e) Squamous cell carcinoma

19. A pregnant patient attends complaining of sensitivity to sweet foods in the upper right sextant, and the dentist suspects an interproximal lesion. Which one of the following diagnostic techniques should be used to confirm the presence of a cavity in this case?
- (a) Application of ethyl chloride
 - (b) Horizontal bitewing radiograph
 - (c) Transillumination
 - (d) Use of Briault probe
 - (e) Use of caries dye
20. Bacteria are single-celled microorganisms responsible for causing many diseases, some of which are relevant to the dental team. Which one of the following bacteria live in colonies arranged as chains of circular microorganisms?
- (a) Bacilli
 - (b) Lactobacilli
 - (c) Spirochaetes
 - (d) Staphylococci
 - (e) Streptococci
21. Bacteria involved in the onset of caries are those capable of producing weak organic acids that demineralise enamel. These acids are produced when the bacteria digest oral food debris. Which one of the following food components is the source of these organic acids?
- (a) Aspartame
 - (b) Fructose
 - (c) Lactose
 - (d) Non-milk extrinsic sugars
 - (e) Polysaccharides
22. The three pairs of major salivary glands are the parotid glands, the submandibular glands and the sublingual glands. A patient attends the surgery with bilateral swelling of the parotid salivary glands, and is diagnosed with which one of the following conditions?
- (a) Diphtheria
 - (b) Measles
 - (c) Mumps
 - (d) Poliomyelitis
 - (e) Rubella
23. When the body undergoes a disease process or is attacked by a pathogenic organism, the tissues involved may exhibit one of several outcomes. Which one of the following outcomes presents as a harmless swelling within the tissue due to an abnormal overgrowth of cells?
- (a) Benign tumour
 - (b) Cyst

- (c) Infection
 - (d) Malignant tumour
 - (e) Ulcer
24. The supporting structures of the teeth are collectively known as the periodontium. Which one of the following describes the point at which the tooth is attached to the periodontium?
- (a) Gingival crevice
 - (b) Gingival papilla
 - (c) Junctional epithelium
 - (d) Lamina dura
 - (e) Periodontal ligament
25. A 35-year-old patient attends for a routine dental examination during which the dentist detects the presence of calculus in the patient's mouth. In which one of the following areas is this most likely to be found?
- (a) Buccal pits
 - (b) Interproximal areas
 - (c) Lingual area of incisors
 - (d) Occlusal fissures
 - (e) Palatal area of incisors
26. Several infections occur in the oral cavity that are of relevance to the dental team. Which one of the following infections is caused by a virus?
- (a) Acute necrotising ulcerative gingivitis
 - (b) Herpetic stomatitis
 - (c) Lateral periodontal abscess
 - (d) Localised osteitis
 - (e) Pericoronitis
27. In the absence of effective oral hygiene techniques, chronic gingivitis will eventually progress into chronic periodontitis. Which one of the following must be present for a diagnosis of periodontitis to be made?
- (a) False pocket
 - (b) Micro-ulcers
 - (c) Subgingival calculus
 - (d) Supragingival calculus
 - (e) True pocket
28. When the body undergoes a disease process or is attacked by a pathogenic organism, the tissues involved may exhibit one of several outcomes. Which one of the following outcomes presents as a shallow break in the skin or mucous membrane?
- (a) Benign tumour
 - (b) Cyst

- (c) Infection
 - (d) Malignant tumour
 - (e) Ulcer
29. Various viral infections are of relevance to the dental team, including those that cause diseases affecting the head and neck region. Which one of the following viruses causes 'cold sores'?
- (a) Epstein-Barr
 - (b) Herpes simplex
 - (c) Herpes varicella
 - (d) Herpes zoster
 - (e) Paramyxovirus
30. Acute necrotising ulcerative gingivitis is an acute periodontal condition that often occurs in young adults with poor oral hygiene. Which one of the following microorganisms has been specifically linked to this condition?
- (a) *Bacillus fusiformis*
 - (b) *Candida albicans*
 - (c) *Porphyromonas gingivalis*
 - (d) *Staphylococcus aureus*
 - (e) *Streptococcus mutans*
31. When attacked by pathogens, the body has several lines of defence that should prevent a disease from developing in a healthy person. Which one of the following is the last line of defence before the disease process begins?
- (a) Inflammatory response
 - (b) Mucous membrane
 - (c) Saliva
 - (d) Skin
 - (e) Sweat
32. When a patient is suffering from dental pain, they are usually advised to take analgesics while dental treatment is carried out to solve the problem. Which one of the following analgesics should be avoided in asthmatic patients?
- (a) Aspirin
 - (b) Codeine
 - (c) Dihydrocodeine
 - (d) Ibuprofen
 - (e) Paracetamol
33. When patients have poor oral hygiene generally, their gingivae gradually become inflamed and chronic gingivitis develops. Which one of the following is the most likely cause of the initial inflammation?
- (a) Bacteria
 - (b) Calculus

- (c) Food debris
 - (d) Toxins
 - (e) Weak acids
34. In the first months of life, babies often develop resistance to specific pathogenic microorganisms by inheriting it from their mother. Which one of the following terms describes this process?
- (a) Acquired immunity
 - (b) Dead vaccine
 - (c) Live vaccine
 - (d) Natural immunity
 - (e) Passive immunity
35. Many patients suffer from chronic gingivitis. At an oral health assessment, this condition can be diagnosed by the presence of which one of the following signs?
- (a) Furcation lesions
 - (b) Gingival hyperplasia
 - (c) Subgingival calculus
 - (d) Tooth mobility
 - (e) True pockets
36. When a tooth becomes infected by a pathogenic microorganism, the pulp tissue undergoes an inflammatory response. Which one of the following describes the final stage of this response?
- (a) Heat
 - (b) Loss of function
 - (c) Pain
 - (d) Redness
 - (e) Swelling
37. During an attack by pathogenic microorganisms, many defence cells and microorganisms are killed, and pus forms. Which one of the following terms describes when pus manages to spread into the surrounding tissues?
- (a) Abscess
 - (b) Acute infection
 - (c) Cellulitis
 - (d) Chronic infection
 - (e) Virulent infection
38. Before being allowed to work at the chair side in the dental surgery, all clinical dental personnel require to be vaccinated against a range of pathogenic microorganisms. It is most likely that personnel will have developed an acquired immunity to which one of the following diseases?
- (a) AIDS
 - (b) Chickenpox
 - (c) Hepatitis B

- (d) Rubella
 - (e) Tetanus
39. On attendance for a dental examination, the dentist identifies a cold sore on the patient's lower lip and asks for the appointment to be rescheduled. When explaining the reason for this to the patient, which one of the following microorganisms are you likely to refer to?
- (a) *Actinomyces*
 - (b) *Borrelia vincenti*
 - (c) *Candida albicans*
 - (d) Herpes simplex
 - (e) *Lactobacillus*
40. Thrush is a fungal disease that can affect the oral cavity, resulting in conditions such as denture stomatitis. It is usually successfully treated by the use of antifungal agents, in the form of tablets, lozenges or oral rinses. Which one of the following drugs is used to treat this condition?
- (a) Amoxicillin
 - (b) Erythromycin
 - (c) Metronidazole
 - (d) Nystatin
 - (e) Penicillin V
41. When the body undergoes a disease process or is attacked by a pathogenic organism, the tissues involved may exhibit one of several outcomes. Which one of the following outcomes presents as a slow-growing abnormal sac of fluid within the tissues?
- (a) Benign tumour
 - (b) Cyst
 - (c) Infection
 - (d) Malignant tumour
 - (e) Ulcer
42. The combination of bacteria and food debris produces a thin, sticky and proteinaceous layer called plaque. Plaque builds up most readily in stagnation areas around the oral cavity. Which one of the following stagnation areas is associated with the development of periodontal disease?
- (a) Buccal pit
 - (b) Crown margin
 - (c) Denture clasp
 - (d) Gingival crevice
 - (e) Interproximal area
43. Various microorganisms can infect the body, causing diseases. Which one of the following is a microorganism whose effects can be prevented by vaccination?
- (a) Bacteria

- (b) Fungi
 - (c) Protozoa
 - (d) Spore
 - (e) Virus
44. During the inflammatory response of body tissues to an invading microorganism, some of the defence cells are able to recognise the pathogen as foreign to normal tissue cells. Which one of the following terms describes these foreign bodies?
- (a) Antibodies
 - (b) Antigens
 - (c) Antitoxins
 - (d) Immunoglobulins
 - (e) Toxins
45. Many sugars added to carbohydrate food products are described as cariogenic, because they can cause dental caries. Which one of the following is the sugar not associated with caries?
- (a) Dextrose
 - (b) Glucose
 - (c) Lactose
 - (d) Maltose
 - (e) Sucrose
46. Oral cancer is a serious, often fatal, condition that appears to be occurring more frequently in younger patients nowadays. Which one of the following has not been identified as a causative factor in this disease?
- (a) Betel nut chewing
 - (b) High alcohol intake
 - (c) High fat diet
 - (d) High vitamin A diet
 - (e) Sunlight
47. Saliva is the watery fluid secreted by the salivary glands that is naturally present in the healthy oral cavity. Patients who have a high rate of caries are likely to have a reduced amount of which one of the following salivary constituents?
- (a) Enzymes
 - (b) Immunoglobulins
 - (c) Inorganic ions
 - (d) Leucocytes
 - (e) Water
48. During an attack by pathogenic microorganisms, the blood supply to the affected tooth will increase so that large numbers of defence cells are brought to the area. Which one of the following is the type of cell involved in this defence mechanism?

- (a) Antibodies
 - (b) Antitoxins
 - (c) Erythrocytes
 - (d) Leucocytes
 - (e) Thrombocytes
49. Diseases caused by infection with bacteria are often treated with a course of antibiotics. Which one of the following antibiotics is prescribed when the infection is due to anaerobic bacteria?
- (a) Amoxicillin
 - (b) Clindamycin
 - (c) Erythromycin
 - (d) Metronidazole
 - (e) Penicillin V
50. Various bacterial infections can occur in the oral cavity and many bacteria have been identified as causing specific orally related diseases. Which one of the following diseases is caused by aerobic bacteria?
- (a) Acute necrotising ulcerative gingivitis
 - (b) Caries
 - (c) Chronic periodontitis
 - (d) Lateral periodontal abscess
 - (e) Pericoronitis
51. The gingivae form the membrane covering of the alveolar processes in the mouth. Which one of the following features is not found when examining healthy gingivae?
- (a) Gingival crevice of 4 mm
 - (b) Knife-edge papillae
 - (c) Pink colour
 - (d) Stippled surface
 - (e) Tight gingival cuff
52. Bacteria are single-celled microorganisms responsible for causing many diseases, some of which are relevant to the dental team. Which one of the following bacteria are shaped like round-ended rods?
- (a) Bacilli
 - (b) Lactobacilli
 - (c) Spirochaetes
 - (d) Staphylococci
 - (e) Streptococci
53. Any patient with poor oral hygiene may develop periodontal disease, but some patients are more at risk than others. This is often because they have been prescribed drugs that cause gingival hyperplasia, making plaque control

difficult. Which one of the following medications is associated with gingival hyperplasia?

- (a) Aspirin
 - (b) Metronidazole
 - (c) Nifedipine
 - (d) Nystatin
 - (e) Propranolol
54. When a sound tooth undergoes a carious attack, the patient will initially feel no sensation. Which of the following indicates the most likely point of the tooth at which the patient will begin to feel sensation?
- (a) At the amelodentinal junction
 - (b) At the apex
 - (c) At the enamel surface
 - (d) At the pulp chamber
 - (e) At the secondary dentine layer
55. Microscopically, the structure of microorganisms is quite distinct and enables them to be identified for the purpose of developing treatments and cures for the diseases they cause. Which one of the following microorganisms possesses hyphae?
- (a) Bacteria
 - (b) Fungi
 - (c) Protozoa
 - (d) Spore
 - (e) Virus
56. Tooth surface loss affecting the occlusal surfaces of the lower molars and the palatal or labial surfaces of the upper incisors is usually due to regular acid attack. Which one of the following disorders would not have this effect on the teeth?
- (a) Anorexia
 - (b) Bulimia
 - (c) Duodenal ulcer
 - (d) Gastric reflux
 - (e) Hiatus hernia
57. Many bacteria have been identified as causing some form of periodontal disease. Which one of the following species is not associated with this condition?
- (a) *Actinomyces*
 - (b) *Bacillus*
 - (c) *Porphyromonas*
 - (d) *Staphylococcus*
 - (e) *Treponema*

58. Dental caries is a commonly occurring infection involving the hard tissues of the teeth. Its development is dependent on various relevant factors. Which one of the following factors is most easily controlled by the patient?
- (a) Formation of weak acids
 - (b) Intake of carbohydrates
 - (c) Meal frequency
 - (d) Neutralising time
 - (e) Presence of bacteria
59. When patients are suffering from chronic gingivitis, they initially develop inflamed gingivae. As the disease progresses and worsens, a set sequence of events occurs in the oral cavity. Which one of the following is the second feature to occur, after the initial inflammation?
- (a) False pocket
 - (b) Micro-ulcers
 - (c) Subgingival calculus
 - (d) Supragingival calculus
 - (e) True pocket
60. In patients suffering from chronic periodontitis, both supragingival and subgingival calculus may be present at the same time. Which one of the following instruments is used specifically to remove subgingival calculus?
- (a) Curette
 - (b) Jaquette scaler
 - (c) Push scaler
 - (d) Sickle scaler
 - (e) Ultrasonic scaler
61. The presence of bacterial plaque in a patient's oral cavity can be exacerbated by plaque retention factors. Which one of the following is an example of an iatrogenic plaque retention factor?
- (a) Crowded teeth
 - (b) Defective filling
 - (c) Incompetent lip seal
 - (d) Poor oral hygiene
 - (e) Small oral aperture

Extended matching questions

Dental pathology

For each of the following dental pathology questions, select the single most appropriate microorganism from the option list. Each option might be used once, more than once, or not at all.

- (a) *Bacillus fusiformis*
- (b) *Candida albicans*
- (c) Cocksackievirus
- (d) Epstein–Barr virus
- (e) Herpes simplex
- (f) Paramyxovirus
- (g) *Porphyromonas gingivalis*
- (h) *Staphylococcus aureus*
- (i) *Streptococcus mutans*

1. An 18-year-old patient attends the surgery as an emergency, complaining of severe gingival pain and halitosis. He admits to being a smoker, and brushing his teeth only once every few days. On examination, his oral hygiene is very poor and his gingivae are swollen and sloughing at the papillae. The dentist diagnoses acute necrotising ulcerative gingivitis. Which one of the options listed is a microorganism associated with this condition?
2. Many adult patients suffer from chronic periodontitis, especially those with risk factors such as smoking and certain medical conditions. Research has discovered that many different microorganisms are involved in this condition: some occur in most patients while others are less often found. Which one of the options listed is one of the microorganisms linked to chronic periodontal disease?
3. A young patient attends the surgery with his mother, who is concerned about a swelling that has developed behind the child's left ear. Despite having a carious upper left first deciduous molar present, the dentist diagnoses mumps in the child, and his mother confirms that he did not receive his MMR vaccination as a baby. Which one of the options listed is the microorganism responsible for this condition?

Dental anatomy

For each of the following dental anatomy questions, select the single most appropriate tissue or cell from the option list. Each option might be used once, more than once, or not at all.

- (a) Ameloblasts
- (b) Amelodentinal junction
- (c) Cementum
- (d) Collagen fibres
- (e) Dentine
- (f) Enamel
- (g) Gingival crevice
- (h) Inorganic prisms
- (i) Intercellular substance

- (j) Junctional epithelium
- (k) Odontoblasts
- (l) Osteoblasts

1. Teeth develop in the first months of embryonic development, and are present in the jaw bones of a baby at birth. They are composed of several different tissue layers which are laid down by different cells during development. Which one of the options listed is a tooth tissue that continues to be laid down throughout life?
2. The teeth are held in their bony sockets by various supporting structures that make up the periodontium. These include the alveolar bone, the periodontal ligament and the gingivae. Which one of the options listed is the type of tissue that forms the periodontal ligament?
3. The teeth are held in their bony sockets by various supporting structures that make up the periodontium. These include the alveolar bone, the periodontal ligament and the gingivae. Which one of the options listed is the cell type that forms the alveolar process of the maxilla and mandible?
4. Teeth develop in the first months of embryonic development, and are present in the jaw bones of a baby at birth. They are composed of several different tissue layers which are laid down by different cells during development. Which one of the options listed is the name of the cells that lay down enamel?
5. The teeth are held in their bony sockets by various supporting structures that make up the periodontium. These include the alveolar bone, the periodontal ligament and the gingivae. Which one of the options listed is the structure normally present around each tooth in health, and can be measured to a depth of 2 mm?
6. Teeth develop in the first months of embryonic development, and are present in the jaw bones of a baby at birth. They are composed of several different tissue layers which are laid down by different cells during development. Which one of the options listed is the name of the tissue that covers the full root surface of a tooth?
7. The teeth are held in their bony sockets by various supporting structures that make up the periodontium. These include the alveolar bone, the periodontal ligament and the gingivae. Which one of the options listed is the name of the specialised tissue present at the point where the gingivae form a tight cuff around each tooth?

Answers

Multiple choice questions

1. *Correct answer: b.* Citric acid is the natural acid found in fruits such as oranges, lemons, limes and grapefruit that gives these citrus fruits their 'tartness' of taste. When eaten or drunk as a fruit juice, they have considerable erosive potential on the enamel of the teeth, especially if consumed between meals or on several occasions throughout the day. Ascorbic acid is also known as vitamin C, and is found in citrus fruits and some green vegetables, but it has no erosive potential. All the other options listed are not found in the diet.
2. *Correct answer: a.* Normally, the sugar content of fruits is not considered cariogenic and they are therefore recommended components of a healthy diet. However, the process of converting the fruit into juice breaks their cell walls and allows the release of their natural sugars, which then become cariogenic if the juice is consumed in sufficient volumes. All the other options listed are considered safe with regard to being sources of non-milk extrinsic sugars.
3. *Correct answer: e.* Early carious lesions appear as white spots of demineralisation on the enamel surface, with no cavitation or dentine involvement detectable. If the lesion is allowed to progress, a cavity will form and reversible pulpitis will occur. If the pulp is affected it will die and a periapical abscess may develop. Root caries tends to occur in older patients where gingival recession allows the exposure of the roots to dietary sugars, so that caries develops.
4. *Correct answer: c.* Dentine is the calcified tissue that forms the bulk of the tooth structure, and is composed of hollow tubes containing the nerve fibrils of the pulp tissue. The tubes are surrounded by organic intercellular substance. Enamel is composed of inorganic prisms, and the periodontal ligament is made up of collagen fibres.
5. *Correct answer: e.* *Streptococcus mutans* is the specific bacterium associated with the onset of caries, and then lactobacilli will colonise established carious lesions. *Actinomyces* and *Bacteroides* are associated with periodontal disease, while *Staphylococcus* is normally associated with skin lesions rather than those occurring within the oral cavity.
6. *Correct answer: d.* Diuretics are often referred to as 'water tablets' by the lay public, and are prescribed to patients with heart conditions where the fluid load needs to be reduced. The tablets therefore cause increased urination, as well as having the side-effect of reducing other bodily fluids, including saliva and tears. Some patients then tend to develop a 'dry mouth' or xerostomia. None of the other drugs in the options list have this side-effect.
7. *Correct answer: a.* Any condition that affects the correct functioning of the immune system and its fight against disease will have an effect on the occurrence and severity of periodontal disease. Diabetes, stress and vitamin C

deficiency are all linked to poor wound healing and the ability of the oral soft tissues to fight off pathogenic attack. Leukaemia is a disease affecting the blood cells and organs of the immune system itself. Asthma has no relationship with the severity of any periodontal disease present.

8. *Correct answer: c.* The patient has developed denture stomatitis, a fungal infection that occurs in denture wearers where poor oral hygiene has allowed the palatal tissues to become colonised by *Candida albicans*. It presents as a white patch that can be wiped off to reveal a sore bleeding area beneath. None of the other options listed present in this way.
9. *Correct answer: d.* When food is first consumed, the neutral pH of the oral cavity will fall within a few minutes. If the critical pH of 5.5 is reached, then demineralisation of the tooth enamel will occur. The buffering action of saliva will gradually raise the pH to its normal level of 7.0, and this will occur well within a period of several hours after food consumption.
10. *Correct answer: c.* The inorganic ion content of saliva, especially calcium, is responsible for the formation of calculus by the mineralisation of plaque. All the other options listed are also constituents of saliva, but they have little if any role to play in the formation of calculus. The higher the inorganic ion content of saliva, the more calculus formation occurs.
11. *Correct answer: b.* The patient has the signs and symptoms of acute necrotising ulcerative gingivitis, an oral infection caused by *Borrelia vincenti*, particularly likely in young adults with poor oral hygiene. None of the other options listed are responsible for this condition, although it can also be caused by *Bacillus fusiformis*.
12. *Correct answer: c.* The ideal concentration of fluoride artificially added to a water supply is 1 part per million (1 ppm). This has been shown to reduce the incidence of caries in the population supplied by up to 50%. Lower concentrations are not effective, while higher concentrations may cause overdose and dental problems such as fluorosis.
13. *Correct answer: e.* Supragingival calculus is that which has formed above the gingival margin of the tooth, in this case along the lingual surface of the lower incisors. A bristle brush is used to prophylactically polish the teeth, after the calculus has been removed. Curettes and hoes are instruments used to remove subgingival calculus. A Cushing scaler is specifically used to remove interdental calculus.
14. *Correct answer: a.* Creutzfeldt–Jakob disease is the human equivalent of ‘mad cow disease’ (bovine spongiform encephalopathy), and is caused by a specialised protein called a prion, rather than by a living microorganism. All the other options listed are caused by a virus.
15. *Correct answer: c.* Attrition is the incisal edge and occlusal surface wear seen in patients who habitually grind their teeth (bruxism). Abrasion is the

cervical margin wear seen as a result of vigorous toothbrushing, and erosion is the palatal and labial surface loss due to acid attack. Abfraction is the surface loss due to tooth fracture that usually affects the cervical areas of heavily loaded teeth.

16. *Correct answer: d.* Bacteria exist in their dormant (non-infective) state as spores. These are similar in function to the seeds of plants, which survive the winter months in a dormant state before growing as new plants the following spring or summer. All the other options listed are potentially infective microorganisms.
17. *Correct answer: e.* The presence of true pockets is one of the diagnostic features of established periodontal disease, and plaque will be present during its active phases. Plaque associated with the gingival crevice of the tooth will be present in gingivitis. Plaque present in any of the other options listed will cause caries rather than periodontal disease.
18. *Correct answer: e.* The vast majority of oral cancers affect the squamous cells of the oral mucosa, especially the sides of the tongue and the floor of the mouth. Basal cell carcinoma and melanoma tend to affect the skin, lymphoma affects lymphatic tissue, and osteosarcoma is a type of cancer affecting the bone.
19. *Correct answer: d.* Interproximal caries is usually diagnosed painlessly using horizontal bitewing radiographs to detect lesions, which appear as blackened areas of the mesial or distal aspects of the tooth. However, as the patient is pregnant, radiographs should be avoided, so the only alternative option listed for detecting caries in this location is the use of a Briault probe.
20. *Correct answer: e.* All cocci bacteria are circular in shape, but colonies of streptococci arrange themselves as chains while staphylococci tend to be found in clusters. Bacilli and lactobacilli are rod-shaped and pointed rod-shaped respectively, while spirochates are spiral-shaped microorganisms.
21. *Correct answer: e.* The cariogenic oral bacteria digest carbohydrate-based foods, breaking them down into their polysaccharide constituents and releasing the weak organic acids that demineralise enamel. Non-milk extrinsic sugars are those products that have been added artificially to food products during their manufacture, such as sucrose and glucose. Fructose and lactose are naturally occurring sugars with very low cariogenic potential. Aspartame is an artificial sweetener.
22. *Correct answer: c.* Mumps is caused by infection with paramyxovirus, and can affect both parotid glands or just one of them. The infection does not affect the other major salivary glands. None of the other options listed are infections that affect the parotid salivary glands.
23. *Correct answer: a.* This is a broad definition for a benign tumour – an abnormal overgrowth of cells which causes no harm to the body, whereas a malignant tumour does cause harm. A cyst is an abnormal fluid-filled cavity

within the tissues, and an ulcer is a shallow break of the surface tissues. An infection is the actual invasion of the tissues by microorganisms.

24. *Correct answer: c.* This is an area of specialised epithelium that only occurs at the point where the tooth and the periodontium meet, hence its name 'junctional'. In patients suffering from periodontal disease, this epithelium is destroyed as true pockets form. When teeth are extracted the specialised tissue is gradually resorbed into the surrounding tissues.
25. *Correct answer: c.* The vast majority of patients develop calculus on the lingual surface of the lower incisor teeth. This is because both the submandibular and the sublingual salivary glands secrete their contents directly onto this surface, and it is the inorganic ion content of saliva that is incorporated into plaque that hardens it to form calculus. The other common area for calculus formation is the buccal surfaces of the upper molar teeth, where the parotid salivary glands empty their secretions.
26. *Correct answer: b.* This is an acute infection with herpes simplex virus that usually affects younger patients, causing oral blistering and general malaise. It is self-limiting and rarely requires treatment, unless the sufferer has a compromised immune system. All the other options listed are caused by bacterial infections.
27. *Correct answer: e.* Bleeding or swollen gingivae are signs of gingivitis rather than periodontitis. Halitosis and the presence of pus can occur in numerous conditions and infections of the oral cavity. True pockets will only be present in patients with periodontitis, and will be diagnosed during a basic periodontal examination by probing.
28. *Correct answer: e.* This is a broad definition of an ulcer, where a shallow break in the tissue surface leaves a raw, often painful, base that bleeds when touched. Tumours occur due to the abnormal overgrowth of tissue cells, cysts are abnormal fluid-filled sacs within the tissues, and an infection is invasion of the tissues by microorganisms.
29. *Correct answer: b.* The initial herpes simplex attack usually occurs at a young age as herpetic stomatitis. The virus remains dormant in nerve tissue, and reappears as a 'cold sore' when the sufferer is stressed or run down, for instance. Epstein–Barr virus causes glandular fever, herpes varicella and zoster cause chickenpox and shingles respectively, and paramyxovirus causes mumps.
30. *Correct answer: a.* Both *Bacillus fusiformis* and *Borrelia vincenti* have been shown to cause this condition. *Porphyromonas gingivalis* is one of the many bacteria associated with chronic periodontitis, and *Candida albicans* is the fungus responsible for oral thrush. *Staphylococcus aureus* causes skin boils and *Streptococcus mutans* is the initial microorganism that causes caries.
31. *Correct answer: a.* The mucous membranes and the skin form the initial line of defence against pathogens by providing a physical barrier. Saliva and sweat

help to dilute and neutralise the pathogens and their toxins before the skin and soft tissues are breached, but once breached, the inflammatory response is triggered as the final line of natural defence. If the microorganisms are overcome and killed during the inflammatory response, no disease occurs.

32. *Correct answer: d.* Ibuprofen has many side-effects, one of which is bronchospasm. Its use by asthmatics may therefore worsen their respiratory signs and symptoms, and even precipitate an acute asthma attack. Consequently, this analgesic should always be avoided in these patients. None of the other options listed are specifically contraindicated in asthmatic sufferers.
33. *Correct answer: d.* Bacterial plaque release toxins as by-products of their digestive activities. When the plaque lies within the gingival crevice, the toxins produced irritate the gingivae in the immediate vicinity and cause inflammation of the tissues, i.e. gingivitis. Calculus formation occurs much later in the process, and weak acids are detrimental to the enamel of the tooth rather than to the gingivae.
34. *Correct answer: e.* Acquired immunity develops following exposure of the individual to a microorganism, either by contracting a specific disease and fighting it off, or by being vaccinated against it using live or dead vaccines. Natural immunity is that which has been randomly inherited, rather than the specific inheritance of the mother's own antibodies and antitoxins, as occurs in passive immunity.
35. *Correct answer: b.* Chronic gingivitis is the slow-onset inflammation of the gingivae, and as with all inflammatory conditions one of its five signs is swelling, i.e. gingival hyperplasia. All the other options listed are signs of periodontitis not gingivitis.
36. *Correct answer: b.* The heat, swelling and redness associated with inflammation occur initially, because the blood supply to the affected area increases to allow the fast ingress of leucocytes to begin fighting the invading microorganisms. The sudden swelling of the tissues that the increased blood supply causes will press on the local nerve endings, causing pain. Once painful, the inflamed area will lose its function so that further pain does not occur.
37. *Correct answer: c.* Cellulitis is a dangerous complication of inflammation, where the infective fluids and pus spread out into the surrounding tissues rather than being contained as they are when they form an abscess. This spread allows the potential for infection to invade deeper areas of the tissues, and is sometimes so severe that a surgical approach is required to allow healing to occur. An acute infection is one that occurs rapidly – the opposite of a chronic infection. A virulent infection is one caused by a powerful microorganism that is difficult for the normal inflammatory response to bring under control.
38. *Correct answer: b.* Chickenpox is a common childhood ailment that the vast majority of people are exposed to and develop acquired immunity against. AIDS

is an ultimately fatal condition with no vaccine available yet. All the other options listed are diseases that require vaccination for all clinical dental personnel.

39. *Correct answer: d.* Herpes simplex is the virus responsible for this condition. *Actinomyces* species and *Borrelia vincenti* are bacteria responsible for periodontal infections, and *Lactobacillus* species are bacteria associated with dental caries. *Candida albicans* is a fungal infection causing oral thrush.
40. *Correct answer: d.* Nystatin is available as lozenges that are allowed to dissolve in the mouth, and is an antifungal treatment for oral thrush. All the other options listed are antibiotics for use against bacterial infections.
41. *Correct answer: b.* This is a broad definition of a cyst, an abnormal sac of fluid that develops within the tissues and which is usually slow-growing. They can develop at root apices as periapical cysts, or around the crowns of unerupted teeth as dentigerous cysts.
42. *Correct answer: d.* There is no difference in the plaque involved in caries or periodontal disease, only in the damage that it causes to the tissues it is associated with: when in contact with a tooth it leads to caries, and when in contact with the gingivae it leads to gingivitis and possibly periodontitis. The gingival crevice is the usual area where gingival and periodontal problems begin.
43. *Correct answer: e.* Acquired immunity can be provided by the vaccination of small doses of either dead or living viruses, or their protein capsules, to produce a controlled immune response where the body develops antibodies and antitoxins to the injected material. It is a form of preventive medicine, and is used because so few antiviral drugs are available once a viral infection occurs, and because viruses also have the potential to mutate and create new variants of the original, making control much more difficult.
44. *Correct answer: b.* Although toxins are one of many substances that can stimulate an immune response when they invade the tissues, the collective term for all substances that act as foreign to the body tissues and stimulate this response is 'antigen'. Antibodies and antitoxins are made by certain leucocytes in response to the initial infective organism, while immunoglobulins are protein-based antibodies that are specific for some diseases.
45. *Correct answer: c.* Lactose is a naturally occurring milk extrinsic sugar, and has little cariogenic potential. All the other options listed are examples of non-milk extrinsic sugars, which can be added artificially to food products during processing and which have great cariogenic potential.
46. *Correct answer: d.* Vitamin A is an important dietary constituent found in some vegetables (especially carrots) and in fish oils, and is required for normal cell growth and protection from infection. While excessive amounts can be consumed in rare cases, there is no link to oral cancer. All the other options listed have been directly linked to the onset of oral cancer, either on the lips (sunlight) or within the oral cavity.

47. *Correct answer: c.* Patients with a watery type of saliva have lower levels of inorganic ions present, such as calcium. While these patients tend not to build up calculus as easily as patients with a higher level of ions, they do have an increased incidence of caries, as the lower ion levels affect the buffering ability of the saliva. This allows demineralisation to occur over a longer period of time than in patients where the organic acids associated with caries are neutralised more quickly.
48. *Correct answer: d.* Various types of leucocytes (white blood cells) are made in the bone marrow and released in times of need to defend the body against infection. Antibodies and antitoxins are the substances released by some of these leucocytes in response to microorganism attack. Erythrocytes are the red blood cells that transport oxygen around the body, and thrombocytes are the blood cells that form platelets for blood clotting.
49. *Correct answer: d.* Anaerobic bacteria are those that thrive in areas of low oxygen availability, such as deep within periodontal pockets. The specific antibiotic used for many periodontal conditions is metronidazole. Amoxicillin and penicillin V are penicillin derivatives for aerobic bacteria, and the other two options listed are antibiotics used as alternatives to penicillin, with a similar spectrum of action.
50. *Correct answer: b.* All the other options listed are infections that occur in areas of low oxygen availability, as they occur within the gingivae or the supporting periodontal structures. They tend to be due to anaerobic bacteria.
51. *Correct answer: a.* A healthy gingival crevice will be up to 2 mm in depth only; one of 4 mm will occur when some degree of periodontitis is present. All the other options listed are signs that would be evident in healthy gingivae.
52. *Correct answer: b.* This is the typical microscopic appearance of lactobacilli, whereas bacilli are pointed rod-shaped bacteria. Cocci species are circular, and spirochaetes are spiral-shaped.
53. *Correct answer: c.* Nifedipine is a medication prescribed to patients suffering from angina or hypertension, and one of its well-known side-effects is to cause gingival hyperplasia in some patients. None of the other options listed is known to have this side-effect.
54. *Correct answer: a.* Fibrils from the nerve fibres of the pulp tissue run through the hollow tubular structure of the dentine, and the carious attack will reach the dentine at the amelodentinal junction. This will therefore be the point at which the patient is likely to experience sensation in the affected tooth. The enamel has no nerve tissue present, and the other three options listed are all beneath and beyond the dentine.
55. *Correct answer: b.* Fungi are plant-like microorganisms, similar to mushrooms and toadstools. They grow as an extensive network of microscopic branches, called hyphae, which lie across the surface of the tissues they are

infecting. They reproduce by budding from the ends of the hyphae as fruiting bodies, and tend to infect the outer surface of the body: the skin, oral mucosa, nails and eyes. None of the other options listed have these characteristics.

56. *Correct answer: a.* Although anorexia is classed as an eating disorder, sufferers tend to starve themselves rather than eat and then regurgitate their food by vomiting, as happens with patients suffering from bulimia. The other three options listed are all medical conditions that often cause the sufferer to regurgitate their stomach contents, so that the teeth are damaged by the acidic environment produced during vomiting.
57. *Correct answer: d.* Staphylococci are cluster-forming colonies of circular microorganisms, usually associated with skin conditions such as boils and pustules. They have not been linked to periodontal disease, while all the other options listed are known causal agents of various periodontal infections.
58. *Correct answer: c.* While patients can control their carbohydrate intake up to a point, they cannot alter the carbohydrate content of processed foods nor remove hidden sugars from them. However, they can completely control the frequency of food intake, and this may range from three set meals per day, through snacking between meals, to 'grazing' throughout the day without set meal times at all. The other three options listed cannot be controlled by the patient: oral bacteria are always present, weak acids will always form with certain foods, and neutralising time depends on the inorganic ion content of each individual's saliva.
59. *Correct answer: a.* The swelling associated with the initial gingival inflammation leads to gingival hyperplasia, where the tissues appear enlarged and puffy along the gingival margin. The increased size of the tissues gives the appearance of a false pocket around each tooth affected. The other options listed develop as the condition worsens into periodontitis.
60. *Correct answer: a.* The instruments used to remove subgingival calculus have to be long enough to reach the base of any periodontal pockets, and thin enough to do so without tearing the gingival tissues. Curettes have been specially designed to achieve this. Ultrasonic scalers may also be used for this purpose, but they are not specifically designed for subgingival débridement – they remove supragingival calculus just as effectively too. The other three options listed are instruments used for removal of supragingival calculus only.
61. *Correct answer: b.* Iatrogenic plaque retention factors are those that have been inadvertently created during the provision of dental treatment, for example overhanging filling edges, poorly fitting dentures, inadequate contact points between restorations. A defective filling is one such factor, and it will allow the retention of plaque in areas it would not normally colonise. None of the other options listed are present due to the provision of dental treatment.

Extended matching questions

Dental pathology

1. *Correct answer: a.* This condition tends to occur in young adult patients with poor oral hygiene, especially those who smoke. Several microorganisms have been linked to its onset, including *Bacillus fusiformis*. Another causative microorganism is *Borrelia vincenti*, hence the disease's alternative title 'Vincent's gingivitis'.
2. *Correct answer: g.* As the question stem states, many microorganisms have been linked to chronic periodontal disease, but the only one listed as an option is *Porphyromonas gingivalis*. Others include *Actinomyces* species, *Prevotella intermedia* and *Treponema denticola*.
3. *Correct answer: f.* Vaccination against mumps is usually given in infancy as the MMR (measles, mumps, rubella) inoculation. Mumps is an infection of the parotid salivary glands by paramyxovirus, and can affect either one gland or both. It appears not to affect the other major salivary glands.

Dental anatomy

1. *Correct answer: e.* Dentine is formed by odontoblasts, which lie along the amelodentinal junction of the tooth structure. Secondary dentine is laid down in response to painful stimuli or caries attack, in an effort to protect the pulp from trauma or infection. In addition, dentine is gradually laid down as a normal ageing process throughout life, so that the pulp chamber becomes smaller and smaller. Endodontic treatment in elderly patients is often abandoned when canals are too fine to be accessed.
2. *Correct answer: d.* Collagen is a protein formed by fibroblasts and forms a type of connective tissue. The fibres are arranged to run from the cementum to the alveolar bone, or the dental soft tissues, and allow the tooth to 'bounce' in its socket during normal chewing actions. The periodontal ligament effectively acts as a shock absorber for the tooth.
3. *Correct answer: l.* All bone is formed by osteoblasts, and the alveolar processes are no exception.
4. *Correct answer: a.* Ameloblasts lay down enamel over the tooth germs in the embryo, and their function is practically completed by birth.
5. *Correct answer: g.* The gingival crevice forms the gingival rim of pink tissue around each tooth in health, and can be probed to a depth of 2 mm. It is the area where plaque retention begins in the absence of good oral hygiene, and develops into gingivitis if the plaque is not removed. The very base of the crevice is a specialised tissue known as the junctional epithelium, where the oral soft tissues and the teeth are connected.

6. *Correct answer: c.* Cementum is the specialised root covering formed by cementoblasts during tooth formation, and lies only over the surface of the roots. It ends as the enamel of the crown begins at the neck of each tooth. Various collagen fibres of the periodontal ligament are connected to it in an organised pattern, to allow the tooth to bounce in its socket during use.
7. *Correct answer: j.* The junctional epithelium is a unique type of epithelial tissue, found only at this point in the oral cavity. It allows attachment of the hard tissue of the tooth to the soft tissue of the base of the gingival crevice, forming a tight cuff around each tooth. In healthy gingivae, the tissue is impermeable to fluids and forms a physical barrier to prevent food debris penetrating the underlying tissues. The attachment is lost when periodontal disease develops.

4

Assessment and Diagnosis

Multiple choice questions

1. A patient attends for an examination complaining of hot and cold sensitivity in the lower left sextant, and the dentist suspects a carious lesion is present. Which one of the following radiographs is most likely to confirm the diagnosis?
 - (a) Dental pantomograph
 - (b) Horizontal bitewing radiograph
 - (c) Occlusal radiograph
 - (d) Periapical radiograph
 - (e) Vertical bitewing radiograph
2. A 20-year-old patient attends the surgery for a dental examination, and while dictating the notes to be recorded the dentist states that the patient exhibits dental hypodontia. Which one of the following features is most likely to be present in patients with this condition?
 - (a) Abnormally large teeth
 - (b) Abnormally small teeth
 - (c) Absent teeth
 - (d) Additional teeth
 - (e) Supernumary teeth
3. It is a legal requirement to take a full medical history when a patient attends the surgery for dental examination and treatment. Which one of the following medical conditions might exhibit signs or symptoms that affect the patient's oral cavity?
 - (a) Angina
 - (b) Diabetes
 - (c) Hepatitis
 - (d) Hyperthyroidism
 - (e) Ulcerative colitis

4. A mother has brought her 13-year-old daughter to the surgery, expressing concern that the teenager's upper canine teeth have not yet erupted. Which one of the following types of radiograph is most likely to be used in order to locate these teeth?
 - (a) Bitewing
 - (b) Dental pantomograph
 - (c) Lateral skull
 - (d) Occlusal
 - (e) Periapical
5. Various types of tooth surface loss have been diagnosed and are now well recognised in the field of dentistry. Which one of the following types of tooth surface loss is caused by bruxism?
 - (a) Abfraction
 - (b) Abrasion
 - (c) Attrition
 - (d) Caries
 - (e) Erosion
6. During periodontal examination, the dentist will carry out a BPE charting. Which one of the following specifically indicates a BPE score 3?
 - (a) Bleeding on probing
 - (b) Furcation involvement
 - (c) Gingival recession
 - (d) Pocket depth up to 5.5 mm
 - (e) Presence of calculus
7. A 14-year-old patient attends the surgery for an orthodontic assessment, before being referred for treatment. The dentist takes a dental pantomograph of the patient to show all the teeth and the jaws. Which one of the following features of this view ensures that the X-ray exposure of the patient is kept to a minimum?
 - (a) Automatic processing machine
 - (b) Fast films
 - (c) Intensifying screens
 - (d) Larger films
 - (e) Light-tight cassette cases
8. During a dental examination, the dentist discovers an area of early enamel demineralisation on the lower right first molar tooth of a teenage patient. Which one of the following is the most likely presentation of this demineralised area?
 - (a) Cavity
 - (b) Periapical abscess
 - (c) Reversible pulpitis
 - (d) Root caries
 - (e) White spot lesion

9. A 16-year-old male patient attends for a clinical examination and it is noted that the upper left permanent lateral incisor tooth is absent. Which one of the following is the most likely FDI notation for this tooth?
 - (a) 12
 - (b) 21
 - (c) 22
 - (d) 52
 - (e) 62
10. When a tooth is exposed to a beam of X-rays during dental radiography, it produces an image of various grey and white contrasts on a black background. The tooth tissues absorb the X-rays at varying levels, depending on their mineral content. Which one of the following terms describes those tissues that absorb little of the beam?
 - (a) Fluorescent
 - (b) Phosphorescent
 - (c) Radiolucent
 - (d) Radiopaque
 - (e) Translucent
11. Before periodontitis develops, the condition of chronic gingivitis will occur. Which one of the following is most likely to be found by the dentist when chronic gingivitis is present?
 - (a) Furcation lesions
 - (b) Gingival hyperplasia
 - (c) Subgingival calculus
 - (d) Tooth mobility
 - (e) True pockets
12. A patient attends for the first stage of endodontic treatment on the upper left central incisor. Which one of the following radiographs is most appropriate at this stage?
 - (a) Bitewing
 - (b) Cephalogram
 - (c) Dental pantomograph
 - (d) Lateral skull
 - (e) Periapical
13. During an orthodontic assessment of a patient, the dentist will often record the severity of any malocclusion present as an Index of Treatment Needs (IOTN) score. Which one of the following indicates the most severe form of malocclusion?
 - (a) IOTN 3a
 - (b) IOTN 4a
 - (c) IOTN 4d
 - (d) IOTN 5a
 - (e) IOTN 5d

14. A teenage girl has completed a diet sheet after two cavities were discovered at her routine examination. Which one of the following products is identified as a source of non-milk extrinsic sugar in her diet?
- (a) Apple juice
 - (b) Plain yoghurt
 - (c) Potatoes
 - (d) Strawberries
 - (e) Sweetcorn
15. An 8-year-old child attends the surgery with a fractured upper right central incisor tooth following a blow to the face. Which one of the following types of radiograph is most likely to be taken to assess the tooth?
- (a) Dental pantomograph
 - (b) Horizontal bitewing
 - (c) Occlusal
 - (d) Periapical
 - (e) Vertical bitewing
16. A 20-year-old female patient attends for a clinical examination and it is noted that the upper right deciduous second molar is retained. Which one of the following is the most likely FDI notation for this tooth?
- (a) 15
 - (b) 25
 - (c) 51
 - (d) 55
 - (e) 65
17. Inflammation of the periodontium is called periodontitis. Which one of the following findings enables the dentist to diagnose this condition?
- (a) Bleeding gingivae
 - (b) Gingival hyperplasia
 - (c) Halitosis
 - (d) Pus
 - (e) True pocket
18. A 30-year-old patient attends the surgery for a routine dental examination, and bitewing radiographs have been taken. The surgery has a manual processing system. Which one of the following sequences ensures that the radiographs are processed correctly?
- (a) Developer, fixer, wash
 - (b) Developer, wash, fixer
 - (c) Developer, wash, fixer, wash
 - (d) Wash, developer fixer
 - (e) Wash, developer, fixer, wash

19. Various types of tooth surface loss have been diagnosed and are now well recognised in the field of dentistry. Which one of the following types of tooth surface loss is caused by vigorous toothbrushing?
- (a) Abfraction
 - (b) Abrasion
 - (c) Attrition
 - (d) Caries
 - (e) Erosion
20. A 20-year-old man attends the surgery as a new patient, complaining of pain in the lower left permanent first molar tooth when chewing. Which one of the following types of radiograph is the dentist most likely to take?
- (a) Bitewing
 - (b) Dental pantomograph
 - (c) Lateral skull
 - (d) Occlusal
 - (e) Periapical
21. While carrying out an oral health assessment, the dentist will often perform a BPE scoring. Which one of the following is associated with BPE score 1?
- (a) Bleeding on probing
 - (b) Furcation involvement
 - (c) Gingival recession
 - (d) Pocket depth up to 5.5 mm
 - (e) Presence of calculus
22. While giving oral health-related dietary advice, the dentist is likely to recommend that a patient avoids excessive consumption of some products, with the aim of reducing the occurrence of enamel demineralisation. Which one of the following is most likely to be advised against?
- (a) Ascorbic acid
 - (b) Citric acid
 - (c) Lactic acid
 - (d) Phosphoric acid
 - (e) Sulphuric acid
23. A 15-year-old teenager attends the surgery as a new patient, with severe crowding of both dental arches. The dentist determines that the patient requires an orthodontic assessment. Which one of the following types of radiograph would be most appropriate at this initial stage?
- (a) Bitewing
 - (b) Cephalogram
 - (c) Dental pantomograph
 - (d) Lateral skull
 - (e) Periapical

24. The dentist has taken a periapical radiograph of an upper left second premolar tooth, which has been fractured and requires extraction. After processing, the radiograph appears black and the image of the tooth cannot be seen. Which one of the following would correctly score the quality assurance rating of this radiograph?
- (a) Score 0
 - (b) Score 1
 - (c) Score 2
 - (d) Score 3
 - (e) Score 4
25. A patient attends for a routine dental examination and the dentist intends to check for interproximal caries. Which one of the following types of radiograph will be most useful for this purpose?
- (a) Bitewing
 - (b) Cephalogram
 - (c) Dental pantomograph
 - (d) Lateral skull
 - (e) Periapical
26. A 15-year-old patient attends the surgery for a routine dental examination. As the patient has developed a malocclusion during jaw growth and tooth eruption, the dentist also carries out an orthodontic assessment. The malocclusion present is classified as Angle's Class II division 1. Which one of the following features is most likely to be present?
- (a) Bilateral crossbite
 - (b) Labial crowding
 - (c) Proclined upper incisors
 - (d) Retroclined lower incisors
 - (e) Reverse overjet
27. During periodontal examination, the dentist will carry out a BPE charting. Which one of the following specifically indicates BPE score 2?
- (a) Bleeding on probing
 - (b) Furcation involvement
 - (c) Gingival recession
 - (d) Pocket depth up to 5.5 mm
 - (e) Presence of a plaque retention factor
28. A 31-year-old pregnant patient attends the surgery complaining of cold sensitivity in the upper anterior sextant. The dentist suspects an interproximal carious lesion in one of the teeth. Which one of the following assessment tools is the dentist most likely to use to confirm the diagnosis?
- (a) Bitewing radiograph
 - (b) Periapical radiograph

- (c) Sickle probe
 - (d) Transillumination
 - (e) Vitality test
29. While carrying out an orthodontic assessment of a patient, the dentist determines any classification of malocclusion that is present by careful consideration of the first molar teeth. When the mesiobuccal cusp of the upper molar lies behind the buccal groove of the lower molar, the classification is most likely to be which one of the following options?
- (a) Class I
 - (b) Class II
 - (c) Class II division 1
 - (d) Class II division 2
 - (e) Class III
30. The dentist has taken a periapical radiograph of a patient's upper left canine tooth, after completing root canal therapy on it. After processing, the radiograph appears very pale and the image of the tooth is too faint to be seen adequately. Which one of the following processing faults is most likely to have occurred?
- (a) Developer solution too cold
 - (b) Developing time too long
 - (c) Fixer solution too concentrated
 - (d) Fixing time too long
 - (e) Not washed thoroughly
31. A new dentist has recently joined the dental practice and you are his assigned dental nurse for the day. While carrying out dental examinations on the patients, he refers to the FDI charting notation of teeth. Which one of the following teeth is referred to as '63'?
- (a) Lower left deciduous canine
 - (b) Lower left deciduous first molar
 - (c) Upper left deciduous canine
 - (d) Upper left deciduous first molar
 - (e) Upper left permanent first molar
32. During periodontal examination, the dentist will carry out a BPE charting. Which one of the following specifically indicates BPE score 4?
- (a) Bleeding on probing
 - (b) Gingival recession
 - (c) Pocket depth greater than 5.5 mm
 - (d) Presence of a plaque retention factor
 - (e) Presence of calculus

33. A patient attends the surgery as an emergency, complaining that the lower left second molar tooth has suddenly become painful and mobile. The dentist suspects that the tooth has developed a localised periodontal problem. Which one of the following types of radiograph should be taken to confirm the diagnosis?
- (a) Dental pantomograph
 - (b) Horizontal bitewing radiograph
 - (c) Lateral oblique
 - (d) Occlusal radiograph
 - (e) Vertical bitewing radiograph
34. During your training course, you have had the opportunity to dismantle an intra-oral X-ray film packet to view its contents. Within the packet is a piece of lead foil. Which one of the following correctly states the reason for this foil to be present in the packet?
- (a) Absorbs scatter
 - (b) Allows the packet to be bent easily
 - (c) Reflects X-rays onto the film
 - (d) Intensifies the image
 - (e) Focuses X-rays into a beam
35. Many adult patients do not have the facilities to brush their teeth after lunch, as they are usually at work without a toothbrush or toothpaste. In these circumstances, the dental profession recommends the use of 'detergent foods' to help with removal of food debris after a meal. Which one of the following is an example of a detergent food?
- (a) Celery stick
 - (b) Cheese spread
 - (c) Fresh peach
 - (d) Plain yoghurt
 - (e) Unflavoured crisps
36. A 10-year-old child attends the surgery with her mother for a routine dental examination, and the dentist suspects that the child is sucking her thumb on occasion. Which one of the following features is most likely to be seen in patients with this parafunctional habit?
- (a) Bilateral crossbite
 - (b) Labial crowding
 - (c) Proclined lower incisors
 - (d) Retroclined upper incisors
 - (e) Reverse overjet
37. It has long been understood that the incorporation of fluoride into the mineral structure of enamel can help to reduce the incidence of dental caries. Which one of the following is an example of systemic fluoride?
- (a) Fluoride gel
 - (b) Fluoride mouthwash

- (c) Fluoride tablets
 - (d) Fluoride toothpaste
 - (e) Fluoride varnish
38. When carrying out dental examinations, the dentist is particularly looking for evidence of dental disease such as caries and periodontitis. Which one of the following methods is of particular use when attempting to diagnose the presence of periodontal bone loss?
- (a) Bitewing radiograph
 - (b) Briault probe
 - (c) Completed diet sheet
 - (d) Disclosing tablets
 - (e) Transillumination
39. The dentist has taken a set of bitewing radiographs of a patient during the dental examination. After processing, the radiographs appear black and the images of the teeth cannot be seen. Which one of the following processing faults is most likely to have occurred?
- (a) Developer solution too cold
 - (b) Developer solution too concentrated
 - (c) Fixer solution too hot
 - (d) Fixing time too long
 - (e) Not washed thoroughly
40. Your dental workplace is very busy and takes many intra-oral radiographs each week. Following induction training, you are responsible for processing the majority of these films, using the automatic processing machine. Which one of the following options correctly states the order of the film packet contents, from the X-ray machine tube side?
- (a) Foil, paper, film, paper
 - (b) Paper, film, paper, foil
 - (c) Paper, film, foil, paper
 - (d) Paper, foil, film, paper
 - (e) Paper, foil, paper, film
41. A mother and her 9-year-old son attend the surgery as new patients for routine dental examinations. While examining the child, the dentist notices evidence of enamel fluorosis affecting the incisor teeth. Which one of the following features is most likely to be evident with these teeth?
- (a) Brown banding
 - (b) Brown mottling
 - (c) Hypomineralised incisal edges
 - (d) White banding
 - (e) White mottling

42. A 35-year-old patient attends the practice with a painful swelling over the upper right lateral incisor tooth. The dentist suspects the presence of an acute periapical abscess and takes a radiograph to confirm the diagnosis. Which one of the following features describes the most likely appearance of this lesion on the radiograph?
- (a) Black area along the root
 - (b) Rounded black area at the apex
 - (c) Rounded white area at the apex
 - (d) White area along the root
 - (e) White rimmed black area at the apex
43. A patient attends the surgery following a blow to the face, which has resulted in the fracture of both upper left incisor teeth. The dentist has taken a periapical radiograph of the teeth, and after processing the film the images of the teeth appear to be squashed and stunted, with little diagnostic value. Which one of the following exposure faults is most likely to have caused this effect?
- (a) Coning
 - (b) Elongation
 - (c) Film movement
 - (d) Foreshortening
 - (e) Under-exposure
44. While carrying out an orthodontic assessment of a patient, the dentist often measures the horizontal distance between the upper and lower central incisor teeth. Which one of the following terms correctly describes this measurement?
- (a) Anterior open bite
 - (b) Crossbite
 - (c) Overbite
 - (d) Overjet
 - (e) Reverse overjet
45. It is now common practice to use film holders when intra-oral radiographs are taken in order to ensure the correct proportions of the image. This technique of radiographic exposure ensures which one of the following occurs, in relation to the angulation of the film?
- (a) Parallel to the bisected angle
 - (b) Parallel to the tooth
 - (c) Parallel to the X-ray beam
 - (d) Perpendicular to the bisected angle
 - (e) Perpendicular to the tooth
46. When carrying out dental examinations, the dentist is particularly looking for evidence of dental disease such as caries and periodontitis. Which one of the following methods is safest for the patient when attempting to diagnose the presence of anterior caries?
- (a) BPE probe
 - (b) Disclosing tablets

- (c) Ethyl chloride
 - (d) Occlusal radiograph
 - (e) Transillumination
47. A 15-year-old patient attends the surgery for a dental examination and the dentist notices that the upper right canine tooth is not present. The patient has had no extractions, so it is assumed that the tooth is unerupted and impacted. Which one of the following radiographic techniques is most likely to be used by the dentist to locate the tooth?
- (a) Bisecting angle
 - (b) Cephalography
 - (c) Digital radiography
 - (d) Parallax
 - (e) Paralleling

Extended matching questions

Dental assessment and diagnosis

For each of the following dental assessment and diagnosis questions, select the single most appropriate diagnostic technique from the option list. Each option might be used once, more than once, or not at all.

- (a) BPE probing
 - (b) Dental pantomograph
 - (c) Electric pulp tester
 - (d) Ethyl chloride
 - (e) Horizontal bitewing
 - (f) IOTN scoring
 - (g) Occlusal radiograph
 - (h) Periapical radiograph
 - (i) Transillumination
 - (j) Vertical bitewing
1. A new patient attends the surgery for a routine dental examination and the dentist carries out a soft tissue assessment, a full mouth dental charting and a periodontal assessment. As the patient has several restorations already present posteriorly, the dentist takes radiographs to ensure that these restorations are sound. Which one of the options listed is the most likely type of view to be taken?
2. Patients sometimes attend the surgery with sudden-onset cold sensitivity in one or more teeth. Very often, no obvious cause is visible and cracks in the enamel are suspected but are sometimes difficult to detect. Which one of the options listed is suitable for use in determining which tooth is cold sensitive?

3. Younger patients who attend for dental examination often have crowding of their dental arches, or jaw discrepancies that can be classified into one of the categories of malocclusion. Which one of the options listed is an assessment method used to determine the severity of an orthodontic problem?
4. There are several causes of pulp infection or death that can occur to teeth, including trauma, caries, excessive thermal stimulation or chemical damage. Often, the patient is unaware that a tooth has died until they develop an abscess. Which one of the options listed is the radiographic view that should be used to diagnose this type of lesion?

Dental charting

For each of the following dental charting questions, select the single most appropriate tooth notation from the option list. Each option might be used once, more than once, or not at all.

- (a) Lower left permanent lateral incisor
 - (b) Lower left third molar
 - (c) Lower right deciduous canine
 - (d) Lower right second premolar
 - (e) Upper left deciduous first molar
 - (f) Upper left first premolar
 - (g) Upper right first premolar
 - (h) Upper right permanent second molar
1. A 13-year-old patient attends for a routine dental examination and the dentist records that tooth 54 is still present. Which one of the options listed is the permanent successor to this tooth?
 2. A patient attends for a three unit fixed-fixed bridge preparation in the lower right quadrant. The two abutment teeth to be prepared are charted as 44 and 46. Which one of the options listed is the tooth most likely to be missing and replaced by the pontic?
 3. An adult patient attends the surgery following a blow to the face during a squash game. The dentist records that there is a laceration to the upper lip that will require suturing, and that tooth 32 is mobile and may require extraction. Which one of the options listed is the notation for this tooth?
 4. A teenage patient attends the surgery for a routine dental examination and the dentist records the presence of a Class II cavity in 24 that will require restoring. Which one of the options listed is the deciduous predecessor to this tooth?

Answers

Multiple choice questions

1. *Correct answer: b.* Horizontal bitewing radiographs are the usual views taken to show the interproximal regions of the molar and premolar teeth. They should show the upper and lower posterior teeth on one side, using the minimum X-ray exposure. Dental pantomographs use much more radiation and will show the full dental arches, which are not required in this instance for diagnostic purposes. Vertical bitewings are taken to show posterior bone levels. The two remaining options listed are not suitable for this diagnostic purpose.
2. *Correct answer: c.* Hypodontia is a condition where some of the teeth are congenitally absent. The likeliest teeth to be missing are the upper permanent lateral incisors and the second premolar teeth. Many patients attend the surgery with missing third molar teeth too, although the absence of these is often due to the shorter jaw lengths of modern humans rather than a failure of the tooth germ to develop, as occurs in patients with hypodontia.
3. *Correct answer: b.* The poor peripheral circulation associated with diabetes makes sufferers prone to poor wound healing with an increased risk of infection. They are therefore more prone to postoperative surgical complications, as well as possible exacerbation of any gingival or periodontal diseases present. They also tend to develop dental abscesses more readily than some other patients. None of the other options listed have any particular oral significance.
4. *Correct answer: d.* As both canine teeth are absent after their normal eruption range of 10–12 years, an upper occlusal radiograph will show the presence or absence of one or both teeth after a single exposure. Two periapical views would be required as an alternative, but would double the patient's X-ray exposure. A dental pantomograph would require a significantly higher X-ray exposure and produce a much greater field of exposure than is required. The other two options listed are unsuitable for this purpose.
5. *Correct answer: c.* Attrition is the incisal edge and occlusal surface wear seen in patients who habitually grind their teeth (bruxism). Abrasion is the cervical margin wear seen as a result of vigorous toothbrushing, and erosion is the palatal and labial surface loss due to acid attack. Abfraction is the surface loss due to tooth fracture that usually affects the cervical areas of heavily loaded teeth.
6. *Correct answer: d.* A pocket depth of up to 5.5 mm is specific to BPE grade 3. Bleeding on probing is specific to BPE grade 1, presence of calculus is specific to BPE grade 2, and both furcation involvement and gingival recession are graded as BPE *, which is the highest grading possible.

7. *Correct answer: c.* Intensifying screens are a feature of extra-oral film cassettes, which glow when exposed to X-rays and intensify the image produced on the film. This enables a shorter exposure time to be used to produce the same intensity of image, and is therefore safer for the patient. Fast films are a feature of intra-oral techniques, and neither automatic processing nor the use of larger films will have an effect on the exposure time. All cassettes must be light-tight, otherwise the image would be lost.
8. *Correct answer: e.* Early carious lesions appear as white spots of demineralisation on the enamel surface, with no cavitation or dentine involvement detectable. If the lesion is allowed to progress, a cavity will form and reversible pulpitis will occur. If the pulp is affected it will die and a periapical abscess may develop. Root caries tends to occur in older patients where gingival recession allows the exposure of the roots to dietary sugars, so that caries develops.
9. *Correct answer: c.* The FDI notation system divides the permanent dentition into quadrants, from the upper right clockwise, as 1, 2, 3 and 4. So the upper right quadrant is 1, the upper left quadrant is 2, and so on. It then notes each permanent tooth by its usual charting number from the midline backwards, so central incisors are 1, lateral incisors are 2, and so on. Therefore the correct FDI charting for the upper left lateral incisor is 22.
10. *Correct answer: c.* The images on radiographic films appear as negatives, so highly mineralised structures such as bone will appear white while structures with little mineral content such as soft tissues will appear dark grey to black. The term 'radiolucent' means a structure is transparent to certain forms of radiation, so the X-rays pass through it rather than being absorbed and will appear black on the film.
11. *Correct answer: b.* Chronic gingivitis is slow-onset inflammation of the gingivae, and as with all inflammatory conditions one of its five signs is swelling, i.e. gingival hyperplasia. All the other options listed are signs of periodontitis not gingivitis.
12. *Correct answer: e.* The dentist will require a full-length radiographic view of the tooth in order to determine the presence of any root curvature, pulp stones, lateral canals or other features that will affect the difficulty of the procedure. Bitewings are not indicated for this tooth or the procedure, and all the other options listed are extra-oral views that will not give suitable detail of the one tooth required.
13. *Correct answer: d.* IOTN scoring is a quick assessment system for determining the severity of a malocclusion. It categorises the overall difficulty from 1 to 5 (mild to severe) and the actual specific difficulty within each category alphabetically, with 'a' being the most severe and indicating an increased overjet. Thus the worst malocclusion possible is 5a.

14. *Correct answer: a.* Normally, the sugar content of fruits is not considered cariogenic and they are therefore recommended components of a healthy diet. However, the process of converting the fruits into juice breaks their cell walls and allows the release of their natural sugars, which then become cariogenic if the juice is consumed in sufficient volumes. All the other options listed are considered safe with regard to being sources of non-milk extrinsic sugars.
15. *Correct answer: d.* The dentist will need to view the full length of the affected tooth and its immediate surrounding structures in order to determine the extent and severity of the injury. The best option with regard to radiographic clarity is the periapical view. If more than one tooth had been damaged, an occlusal view would be more appropriate as several teeth can be viewed at once with this size of film. None of the other three options listed would be suitable in this instance.
16. *Correct answer: d.* The FDI notation system divides the deciduous dentition into quadrants, from the upper right clockwise, as 5, 6, 7 and 8. So the upper right quadrant is 5, the upper left quadrant is 6, and so on. It then notes each deciduous tooth by its usual charting number of 1 to 5 from the midline backwards, so central incisors are 1, lateral incisors are 2, and so on. Therefore the correct FDI charting for the upper right deciduous second molar is 55.
17. *Correct answer: e.* Bleeding or swollen gingivae are signs of gingivitis rather than periodontitis. Halitosis and the presence of pus can occur in numerous conditions and infections of the oral cavity. True pockets will only be present in patients with periodontitis, and will be diagnosed during a basic periodontal examination by probing.
18. *Correct answer: c.* The exposed film must be placed in the alkaline developer first in order to produce the latent image. However, this chemical must be washed off the film before it is then placed into the acidic fixer solution, where the image is permanently formed. This solution is then also washed off before the film is dried and mounted for viewing. Washing the film between the processing tanks ensures that the chemicals do not contaminate each other, and washing the fixer off at the end of processing ensures the image is visible.
19. *Correct answer: b.* Abrasion is seen as a deep ridge at the cervical necks of the buccal and labial surfaces of the teeth, and is caused by the patient using a vigorous sawing action during toothbrushing. Attrition is the incisal edge and occlusal surface wear seen in patients who habitually grind their teeth (bruxism). Erosion is the palatal and labial surface loss due to acid attack, and abfraction is the surface loss due to tooth fracture that usually affects the cervical areas of heavily loaded teeth.
20. *Correct answer: a.* Pain on chewing indicates that the patient has a reversible pulpitis rather than an endodontic problem, so the most likely radiograph to confirm the diagnosis is a bitewing. This will detect interproximal caries and

residual caries beneath any restorations present. A periapical view would be used when the symptoms indicate that irreversible pulpitis may be present. Extra-oral views are not indicated when single teeth are being viewed, and an occlusal view would not show the relevant tooth in this case.

21. *Correct answer: a.* Bleeding on probing is specific to BPE grade 1, the presence of calculus is specific to BPE grade 2, and a pocket depth up to 5.5 mm is specific to BPE grade 3. Both furcation involvement and gingival recession are graded as BPE *, which is the highest grading possible.
22. *Correct answer: b.* Citric acid is the natural acid found in fruits such as oranges, lemons, limes and grapefruit that gives them their 'tartness' of taste. When eaten or drunk as a fruit juice, they have considerable erosive potential on the enamel of the teeth, especially if consumed between meals or on several occasions throughout the day. Ascorbic acid is also known as vitamin C, and is found in citrus fruits and some green vegetables, but it has no erosive potential. All the other options listed are not found in the diet.
23. *Correct answer: c.* The intra-oral views are most likely to be taken during disease diagnosis. A lateral skull view would be of little value for an orthodontic assessment, and a cephalogram is a specialist orthodontic view that is taken to determine jaw discrepancies. A dental pantomograph would show the presence of all teeth, including any unerupted ones, and any dental pathology or problems that may contraindicate orthodontic treatment.
24. *Correct answer: d.* The quality assurance rating set out in clinical governance guidelines runs from 1 to 3. Score 1 indicates 'excellent quality', score 2 indicates 'diagnostically acceptable with minimal errors' and score 3 indicates 'unacceptable quality of no diagnostic value'. As the image cannot be seen in this case, it must be a score 3.
25. *Correct answer: a.* Bitewing radiographs show the upper and lower posterior teeth in occlusion, with no overlap of the contact points. They are therefore ideal for detecting the presence of interproximal caries. A periapical view is used when the full tooth is to be viewed, and a dental pantomograph would expose the patient to an unacceptable level of X-rays if used for this purpose. The other two options are of no value in this case.
26. *Correct answer: c.* Proclined upper incisors are the classic diagnostic feature of Class II division 1 malocclusion, where the mandible is posterior to its normal occlusion and the lower lip is positioned behind the upper incisors so that they often protrude. A reverse overjet is a feature of Class III malocclusion, and while the other three options may indeed be present in a Class II division 1 malocclusion, they are not always so.
27. *Correct answer: e.* A plaque retention factor is anything that allows plaque to develop where it normally would not, and includes the presence of calculus, an overhanging margin of a restoration, and other iatrogenic factors. Their

presence is specific to BPE 2. Bleeding on probing is specific to BPE 1, a pocket depth up to 5.5 mm is specific to BPE 3, and both furcation involvement and gingival recession are graded as BPE *, which is the highest grading possible.

28. *Correct answer: d.* As the patient is pregnant the dentist will try to avoid taking a radiograph if at all possible. Transillumination is a useful diagnostic technique where the curing light is shone through the anterior teeth and viewed palatally with the mouth mirror. Interproximal caries will appear as a shadow. A sickle probe is not designed to detect an interproximal cavity, and vitality testing will not detect caries.
29. *Correct answer: e.* When the mesiobuccal cusp of the upper molar is behind the lower buccal groove, the mandible is in fact too far forwards and this is found in Class III malocclusions. The patient will have a degree of prominence of the chin. The mesiobuccal cusp of the upper molar will lie in front of the lower buccal groove in patients with a Class II malocclusion, and will lie at the buccal groove in Class I malocclusions.
30. *Correct answer: a.* The developer solution must be at the correct temperature and concentration to develop the radiographic image effectively, and the film must be immersed in the processing solutions for the correct time too. Excessive temperature, time or concentration will all over-develop the film and it will appear black. Inadequate temperature, time or concentration will under-develop the film and it will appear pale. Inadequate washing will leave a crystalline residue on the film.
31. *Correct answer: c.* The FDI notation system divides the deciduous dentition into quadrants, from the upper right clockwise, as 5, 6, 7 and 8. So the upper right quadrant is 5, the upper left quadrant is 6, and so on. It then notes each deciduous tooth by its usual charting number of 1 to 5 from the midline backwards, so central incisors are 1, lateral incisors are 2, and so on. Therefore the FDI notation 63 is the upper left deciduous canine tooth.
32. *Correct answer: c.* A pocket depth greater than 5.5 mm is specific to BPE grade 4. Bleeding on probing is specific to BPE grade 1, and the presence of calculus or other plaque retention factors are specific to BPE grade 2. Gingival recession is graded as BPE *, which is the highest grading possible.
33. *Correct answer: e.* Of the options listed, only the vertical bitewing view will clearly show any periodontal bone loss associated with the tooth. The clarity of this intra-oral view is far superior to that of the dental pantomograph, and exposes the patient to a much lower level of X-rays too. None of the other options listed are suitable views for this diagnosis.
34. *Correct answer: a.* When an X-ray beam is fired at the body's tissues, those rays that pass through the tissues are either absorbed or scattered. Those that are scattered will then bounce around as they gradually lose energy, but could repeatedly activate the film emulsion so that a confusing image is produced.

The lead foil prevents this happening by absorbing these scattered rays so that a clear image is produced after processing. None of the other options listed are a function of the lead foil.

35. *Correct answer: a.* A stick of celery contains no sugars and requires plenty of chewing before it is rendered into a bolus for swallowing. The copious chewing activity required will increase salivary flow, so that residual food debris has a good chance of being naturally washed away from the teeth and swallowed. The inorganic ions of the saliva will also neutralise the pH of the oral cavity, so that demineralisation cannot occur. None of the other options listed will have such a profound 'detergent' effect.
36. *Correct answer: a.* The sucking action created during this activity can have a considerable effect on the patient's dentition. The muscular activity of the cheeks creates a bilateral crossbite, while the physical presence of the digit between the anterior teeth tends to procline the upper incisors and retrocline the lower incisors. In addition, the digit can prevent the normal eruption of the anterior teeth into occlusion, so that an anterior open bite is produced.
37. *Correct answer: c.* Any fluoride product that is ingested and becomes incorporated into the internal structure of the teeth is systemic, such as fluoridated water, or fluoride drops and tablets. Any fluoride product that is applied to the external surface of the teeth is topical, such as gels, varnishes, and routine oral health products.
38. *Correct answer: a.* Both horizontal and vertical bitewing radiographs will show the interdental bone levels of the posterior teeth. A Briault probe and transillumination are methods of detecting interproximal caries, disclosing tablets are used to show the presence of plaque, and diet sheets are used to identify the source of cariogenic foods and drinks.
39. *Correct answer: b.* The developer solution must be at the correct temperature and concentration to develop the radiographic image effectively, and the film must be immersed in the processing solutions for the correct time too. Excessive temperature, time or concentration will over-develop the film and it will appear black. Inadequate temperature, time or concentration will under-develop the film and it will appear pale. Inadequate washing will leave a crystalline residue on the film. A warm fixing solution will produce the permanent image more quickly than expected, but once the image is fixed it is permanent. A film cannot be 'over-fixed'.
40. *Correct answer: b.* All options stating that the foil is before the film will prevent the penetration of the X-ray beam onto the film. A layer of black paper lies between the film and the foil so that the former is not scratched by the latter.
41. *Correct answer: e.* White mottling of the teeth is the classic diagnostic appearance of enamel fluorosis, caused by excessive ingestion of fluoride

during enamel formation. Although unsightly, the enamel is strong rather than hypomineralised. Banding and brown mottling are features of medication staining of the teeth, such as occurs with the antibiotic tetracycline.

42. *Correct answer: b.* The abscess will appear as a rounded radiolucent area around the apical foramen of the tooth, so it will be black. Periodontal abscesses tend to occur along the root, and a periapical cyst will appear as a white-rimmed black area at the apex.
43. *Correct answer: d.* Without the use of a film holder, the X-ray tube head and the film will require positioning so that a bisecting angle technique can be used. If the tube head is angled too steeply to the imaginary bisection line, the image of the teeth will appear squashed up and much shorter than they actually are – this is called foreshortening. The opposite positioning will produce elongation, coning occurs when the tube head position allows an exposure cut-off of the film, and film movement will produce a blurred image. Under-exposure will produce a faint image.
44. *Correct answer: d.* The overjet is measured to record the linear difference between the upper and lower incisors, usually between 2 and 4 mm. If greater, the incisors are proclined; if less, the patient is tending to an edge-to-edge bite or even a reverse overjet. This can occur in Class III malocclusions. The overbite is the vertical overlap of the incisors, as a percentage; when there is no overlap the patient has an anterior open bite. A crossbite exists when the upper side teeth lie inside the bite of those of the lower jaw.
45. *Correct answer: b.* The alignment produced using a film holder is the paralleling technique, where the tooth and film are parallel to each other and the X-ray beam is perpendicular to both, so that no distortion of the image occurs. None of the other options listed will result in this alignment.
46. *Correct answer: e.* Transillumination is the technique of shining the curing light through the anterior teeth and viewing it palatally in a mouth mirror. Interproximal lesions will appear as shadows. A similar result can be produced using an occlusal radiograph, but the patient must be exposed to X-rays to achieve it. None of the other options listed are caries detection techniques.
47. *Correct answer: d.* This technique involves taking two views of the unerupted tooth, at different angles from each other. The two views can then be compared for the relative change seen in the position of the unerupted tooth in order to determine whether it is positioned palatal or labial to the dental arch. The two radiographs used are usually an occlusal and a periapical. The former is exposed in the midline, and the latter from the side. If the unerupted tooth appears to move in the same direction as that of the X-ray tube head between the two views, then it is lying palatal to the dental arch.

Extended matching questions

Dental assessment and diagnosis

1. *Correct answer: e.* Left and right horizontal bitewings are the standard views when assessing the posterior teeth. Vertical bitewing radiographs are used to show periodontal bone levels of the posterior teeth.
2. *Correct answer: d.* Ethyl chloride is a colourless liquid that evaporates rapidly in air at normal room temperature. When a cottonwool pellet is soaked in the liquid, ice crystals immediately form as the liquid evaporates and the pellet surface is cold to the touch. When applied to a dried tooth surface, the patient should experience that coldness if the tooth is vital.
3. *Correct answer: f.* The Index of Orthodontic Treatment Need (IOTN) is a scoring system developed to help determine which patients have a functional need for orthodontic treatment, rather than an aesthetic need alone. It records the severity of any malocclusions present, using a numbering system of 1 to 5 (5 being most severe) and a letter to indicate the main cause of the malocclusion. So 'a' indicates an increased overjet, 'd' indicates a contact point discrepancy between adjacent teeth, and so on.
4. *Correct answer: h.* The view used should show the full length of the tooth involved, right to the apex so that the periapical area can be seen clearly. Although other options may also give this view, the periapical involves the minimum X-ray exposure to the patient for the same result and is therefore the preferred choice.

Dental charting

1. *Correct answer: g.* 54 is the FDI notation for the upper right deciduous first molar tooth, which is succeeded in the permanent dentition by the upper right first premolar tooth.
2. *Correct answer: d.* 44 and 46 are the FDI notations for the lower right first premolar and the lower right first permanent molar teeth respectively. A fixed-fixed bridge, by definition, has the pontics between the two abutment teeth, so in this case that will be the lower right second premolar tooth, FDI notation 45.
3. *Correct answer: a.* 32 is the FDI notation for the lower left lateral incisor tooth.
4. *Correct answer: e.* 24 is the FDI notation for the upper left first premolar tooth, and the deciduous predecessor of it was the upper left deciduous first molar tooth, FDI notation 64.

5

Restorative Dentistry and Dental Materials

Multiple choice questions

1. A patient has had a full gold crown fitted on the lower left second molar tooth, but experiences discomfort in the tooth when closing the mouth fully. Which one of the following items is required to solve the problem?
 - (a) Articulating paper
 - (b) Ball-ended burnisher
 - (c) Friction grip diamond fissure bur
 - (d) Latch grip stainless steel rosehead bur
 - (e) Ward's carver
2. The dentist is carrying out root canal therapy on the lower left first molar tooth. The root canals have been accessed and their contents are ready to be extirpated. Which one of the following instruments are you most likely to pass to the dentist?
 - (a) Barbed broach
 - (b) Finger spreader
 - (c) Gates Glidden drill
 - (d) Hand file
 - (e) Rotary paste filler
3. A patient attends the surgery for a routine dental examination, and the dentist notices several abrasion cavities. Which one of the following is the most likely Black's classification of these lesions?
 - (a) Class I
 - (b) Class II
 - (c) Class III
 - (d) Class IV
 - (e) Class V

4. Glass ionomer cements are a versatile and widely used dental material and have been available for many years. Which one of the following is the main advantage of this material over composites?
 - (a) Adhesive to enamel
 - (b) Easily polished
 - (c) Greater strength
 - (d) Releases fluoride
 - (e) Superior aesthetics
5. When permanent teeth in children are traumatised, death of the pulp is not an inevitable consequence and a pulpotomy procedure can be carried out. Which one of the following is the most likely reason for using calcium hydroxide in this procedure?
 - (a) Fill the root canal
 - (b) Maintain pulp vitality in chamber
 - (c) Seal the apex
 - (d) Seal the root canal
 - (e) Sterilise the root canal
6. One of the best tooth-coloured restorative materials available to dentists for the restoration of teeth is composite. The material is available in a large range of shades, but they all contain which one of the following constituents?
 - (a) Calcium hydroxide
 - (b) Inorganic filler
 - (c) Polyacrylate and quartz
 - (d) Resin, silver and polyacrylate
 - (e) Silver and quartz
7. When fixed restorations are to be constructed, the tooth is first prepared and an impression is taken. Which one of the following impression materials is least likely to be used for this procedure?
 - (a) Addition silicone
 - (b) Alginate
 - (c) Condensation silicone
 - (d) Polyether
 - (e) Polyvinyl siloxane
8. At the fit stage of denture construction, the patient will attend for final insertion of the completed dentures and be given advice on their care and wear. Which one of the following instruments is required at this stage?
 - (a) Articulator
 - (b) Carborundum stone
 - (c) Gas burner
 - (d) Mixing spatula
 - (e) Plaster knife

9. The dentist is carrying out root canal therapy on the upper left second premolar tooth. All the caries has been removed and the dentist now needs to gain access to the root canal. Which one of the following instruments are you most likely to pass to the dentist?
 - (a) Barbed broach
 - (b) Finger spreader
 - (c) Gates Glidden drill
 - (d) Hand file
 - (e) Rotary paste filler
10. A patient attends for the restoration of a Class II cavity in a lower molar tooth. Following caries removal and lining of the cavity, the dentist is most likely to require which one of the following items?
 - (a) Articulating paper
 - (b) Floss
 - (c) Gingival retraction cord
 - (d) Matrix outfit
 - (e) Wooden wedge
11. A slow-speed handpiece is used for several procedures in dentistry, including the fine removal of caries in deep cavities. Which of the following indicates the speed at which this handpiece operates?
 - (a) 20 000 rpm
 - (b) 30 000 rpm
 - (c) 40 000 rpm
 - (d) 50 000 rpm
 - (e) 60 000 rpm
12. Zinc oxide and eugenol cement is a versatile and widely used material in dentistry, with various different uses. Which one of the following situations is one where this material would not be used?
 - (a) Impression paste
 - (b) Lining under composite
 - (c) Periodontal dressing
 - (d) Root filling paste
 - (e) Sedative dressing
13. Various dental impression materials are available for use during the construction of partial acrylic dentures. Which one of the following materials cannot be used for this purpose?
 - (a) Addition silicone
 - (b) Alginate
 - (c) Condensation silicone
 - (d) Impression paste
 - (e) Polyether

14. A patient attends for an amalgam restoration of the lower left second premolar tooth. The dentist removes the caries from the cavity and informs you that there is a pinpoint pulp exposure. Which one of the following materials are you most likely to be asked to prepare?
- (a) Calcium hydroxide
 - (b) Glass ionomer cement
 - (c) Polycarboxylate cement
 - (d) Zinc oxide and eugenol cement
 - (e) Zinc phosphate cement
15. The dentist is completing root canal therapy on the lower right lateral incisor tooth. You have mixed a suitable root filling material. Which one of the following instruments are you most likely to pass to the dentist so that the material can be inserted into the canal?
- (a) Barbed broach
 - (b) Finger spreader
 - (c) Gates Glidden drill
 - (d) Hand file
 - (e) Rotary paste filler
16. When using composite material to restore a cavity, an etching technique is used to chemically roughen the enamel surface and allow a good bond to form between the filling and the tooth. Which one of the following materials is used during this procedure?
- (a) Hydrochloric acid
 - (b) Hydrogen peroxide
 - (c) Phosphoric acid
 - (d) Polyacrylic acid
 - (e) Sodium hypochlorite
17. A 5-year-old child presents for a routine dental check-up. On intra-oral examination the dentist suspects an interproximal cavity between the lower left deciduous molars. Which one of the following is the most suitable instrument to confirm this diagnosis?
- (a) BPE probe
 - (b) Briault probe
 - (c) Sickie probe
 - (d) Straight probe
 - (e) Williams' periodontal probe
18. After caries has been removed from a cavity and it has been correctly shaped to receive the restoration, the dentist often places a lining material over the floor of the cavity. Which one of the following describes the additional advantage that calcium hydroxide used in this way has over other linings?
- (a) Chemically calms the pulp
 - (b) Promotes the formation of secondary dentine

- (c) Protects the pulp from chemical irritation
 - (d) Protects the pulp from thermal irritation
 - (e) Seals the pulp from residual bacteria
19. Zinc phosphate cement has various uses in dentistry, and is produced by the careful mixing of zinc oxide powder with liquid phosphoric acid. Which one of the following is most likely to cause the material to set slowly?
- (a) Excess powder
 - (b) Inadequate powder
 - (c) Moisture
 - (d) Thin glass slab
 - (e) Warm glass slab
20. Amalgam is a commonly used dental material for the restoration of cavities, in posterior teeth particularly. What is the main constituent of the alloy powder?
- (a) Copper
 - (b) Mercury
 - (c) Silver
 - (d) Tin
 - (e) Zinc
21. When a tooth has been traumatised or attacked by cariogenic bacteria, it often results in the condition of irreversible pulpitis if left untreated. Which one of the following treatments is appropriate to save the tooth when this condition occurs?
- (a) Apicectomy
 - (b) Open apex root filling
 - (c) Pulp capping
 - (d) Pulpectomy
 - (e) Pulpotomy
22. The majority of composite materials in use nowadays require exposure to a curing light to set fully. Which one of the following indicates the depth of material that the curing light can penetrate?
- (a) 0.5 mm
 - (b) 1.0 mm
 - (c) 1.5 mm
 - (d) 2.0 mm
 - (e) 2.5 mm
23. When placing a plastic restoration, the dentist often uses a matrix system to prevent the creation of an overhang on the resultant filling. Which one of the following is most likely to require a Siqueland matrix outfit?
- (a) Class I
 - (b) Class II
 - (c) Class III
 - (d) Class IV
 - (e) Class V

24. A patient returns to the surgery following placement of a restoration in the upper right first premolar. He is complaining of thermal sensitivity in the tooth, and the dentist decides to remove the restoration and place a temporary dressing. Which one of the following materials are you most likely to be asked to prepare?
- (a) Calcium hydroxide
 - (b) Glass ionomer cement
 - (c) Polycarboxylate cement
 - (d) Zinc oxide and eugenol cement
 - (e) Zinc phosphate cement
25. During the restoration of a particularly deep cavity in the upper left first premolar tooth, the dentist must carefully remove the caries overlying the pulp chamber, without causing an exposure. Which one of the following instruments is used to achieve this?
- (a) Ball-ended burnisher
 - (b) Enamel chisel
 - (c) Flat plastic instrument
 - (d) Friction grip diamond fissure bur
 - (e) Spoon excavator
26. During restorative procedures, it is very important to maintain good moisture control. This can be achieved successfully using a variety of methods. Which one of the following methods is least likely to be used during caries removal in a tooth cavity?
- (a) 3:1 syringe
 - (b) Cottonwool roll
 - (c) Disposable saliva ejector
 - (d) High-speed aspirator
 - (e) Rubber dam
27. An air turbine handpiece is used for many procedures in dentistry. It uses friction grip diamond or tungsten carbide burs to quickly remove tooth tissue during preparation procedures. What speed does the air turbine operate at?
- (a) 200 000 rpm
 - (b) 300 000 rpm
 - (c) 400 000 rpm
 - (d) 500 000 rpm
 - (e) 600 000 rpm
28. During root canal therapy, the dentist will use various specialised endodontic instruments to carry out each stage of the treatment. Which one of the following instruments is used to remove contaminated dentine from the root canal?
- (a) Barbed broach
 - (b) Finger spreader
 - (c) Gates Glidden drill

- (d) Hand file
 - (e) Hand reamer
29. Several materials are available to the dentist for use as temporary or permanent restorations. Other materials can be used as luting cements. Which one of the following cannot be used as a luting cement?
- (a) Composite
 - (b) Glass ionomer
 - (c) Polycarboxylate
 - (d) Zinc oxide and eugenol
 - (e) Zinc phosphate
30. A patient attends the surgery for the preparation of the lower right first molar tooth for a full gold crown. Once the tooth has been anaesthetised, which one of the following burs is the dentist most likely to use for tooth preparation?
- (a) Friction grip fissure bur
 - (b) Friction grip inverted cone bur
 - (c) Friction grip tapered bur
 - (d) Latch grip pear-shaped bur
 - (e) Latch grip rosehead bur
31. The majority of amalgam preparations for filling cavities are presented as preloaded capsules, which are mixed in an amalgamator. Which one of the following actions results in contraction of the mixed amalgam, allowing caries to recur?
- (a) Excessive amalgamation
 - (b) Inadequate amalgamation
 - (c) Inadequate mixing time
 - (d) Prolonged mixing time
 - (e) Saliva contamination
32. Adequate retention of a full upper acrylic denture in a patient's mouth depends on the presence of a saliva film between the denture and the palate. Which one of the following structures on the denture allows the film to develop here?
- (a) Clasp
 - (b) Connector
 - (c) Flange
 - (d) Lingual bar
 - (e) Post dam
33. Several restorative materials are commonly used to restore teeth, some of which are tooth coloured to give improved aesthetics. Which one of the following materials has cariostatic properties?
- (a) Amalgam
 - (b) Composite

- (c) Glass ionomer
 - (d) Gold
 - (e) Porcelain
34. A patient returns to the surgery complaining of a rough edge to a recently provided composite restoration in the upper left central incisor. Once the dentist has located the rough margin, which one of the following instruments will be required?
- (a) Ball-ended burnisher
 - (b) Friction grip pear-shaped finishing bur
 - (c) Latch grip stainless steel rosehead bur
 - (d) Miller's forceps
 - (e) Ward's carver
35. During root canal therapy, the dentist will use various specialised endodontic instruments to carry out each stage of the treatment. Which one of the following instruments is used to condense the filling material into the canal?
- (a) Barbed broach
 - (b) Finger spreader
 - (c) Gates Glidden drill
 - (d) Hand file
 - (e) Hand reamer
36. Zinc phosphate cement has various uses in dentistry, and is produced by mixing zinc oxide powder with liquid phosphoric acid. Which one of the following situations is one where this material would not be used?
- (a) Blocking an undercut
 - (b) Cementing a bridge
 - (c) Cementing an orthodontic band
 - (d) Lining a deep cavity
 - (e) Temporary filling
37. Glass ionomer cement is a widely used material in dentistry. Which one of the following situations is one where this material would not be used?
- (a) Cementing a crown
 - (b) Class II restoration
 - (c) Class V restoration
 - (d) Fissure sealant
 - (e) Lining a cavity
38. A patient attends for restoration of an upper right second molar tooth. Following caries removal, lining placement and insertion of the filling material, which one of the following instruments is used to fully adapt the material to the cavity?
- (a) Amalgam carrier
 - (b) Amalgam plugger

- (c) Ball-ended burnisher
 - (d) Briault probe
 - (e) Ward's carver
39. Calcium hydroxide cement is a widely used dental material. It can be presented as a chemical setting paste system or as a single paste light cure preparation. Which one of the following situations is one where this material would not be used?
- (a) Lining a deep cavity
 - (b) Luting cement
 - (c) Open apex endodontics
 - (d) Pulp capping
 - (e) Pulpotomy
40. Once the root canal has been cleaned of all contaminated contents during root canal therapy, it is often temporarily filled with an antiseptic dressing. Which one of the following materials is included in this dressing?
- (a) Calcium hydroxide
 - (b) Glass ionomer
 - (c) Zinc eugenol
 - (d) Zinc phosphate
 - (e) Zinc polycarboxylate
41. Several dental materials used for restoration are adhesive to enamel or dentine, but others are not. Which one of the following materials requires the presence of undercuts for it to remain in place?
- (a) Amalgam
 - (b) Composite
 - (c) Glass ionomer
 - (d) Gold
 - (e) Porcelain
42. An inlay is a restoration produced in the laboratory to restore a cavity in a tooth, unlike a filling which is produced at the chair side. Which one of the following indicates the difference between the preparation of a tooth for filling and the preparation of a tooth for an inlay?
- (a) Use of anaesthetic
 - (b) Use of dentinal pins
 - (c) Use of dovetail shape
 - (d) Use of lining
 - (e) Use of undercuts
43. Amalgam is possibly the most widely used permanent filling material for posterior teeth. Its alloy constituents can be varied to produce a mix that is less likely to discolour with time in saliva. Higher levels of which one of the following materials are most likely to produce resistance to discoloration?
- (a) Copper
 - (b) Mercury

- (c) Silver
 - (d) Tin
 - (e) Zinc
44. Glass ionomer cements have many applications, including the addition of metal powder to enable their use as a core build-up material. Which one of the following is the dental term for these enhanced products?
- (a) Cermets
 - (b) Compomers
 - (c) Composites
 - (d) Compoules
 - (e) Conditioners
45. When permanent teeth in children are traumatised, it often occurs before closure of the apical foramen and an open apex root filling should be performed. Which one of the following is the most likely reason for using calcium hydroxide in this procedure?
- (a) Fill the root canal
 - (b) Maintain pulp vitality in chamber
 - (c) Seal the apex
 - (d) Seal the root canal
 - (e) Sterilise the root canal
46. A patient attends for a Class II restoration in the upper right second molar tooth. Following caries removal and lining of the cavity, which one of the following instruments is used to place the filling material?
- (a) Amalgam carrier
 - (b) Amalgam plugger
 - (c) Ball-ended burnisher
 - (d) Briault probe
 - (e) Ward's carver
47. Before taking an impression of a tooth which has been prepared for a crown, the dentist ensures that the preparation margins are clearly visible. Which one of the following instruments is used for this purpose?
- (a) Crown form
 - (b) Dam clamp
 - (c) Matrix band
 - (d) Retraction cord
 - (e) Wooden wedge
48. After caries has been removed from a cavity and it has been correctly shaped to receive the restoration, the dentist often places a lining material over the floor of the cavity. Which one of the following describes the

additional advantage that zinc oxide and eugenol cement has over other linings?

- (a) Chemically calms the pulp
- (b) Promotes the formation of secondary dentine
- (c) Protects the pulp from chemical irritation
- (d) Protects the pulp from thermal irritation
- (e) Seals the pulp from residual bacteria

49. Composite materials are the preferred choice when restoring anterior teeth, as their aesthetics are superior to amalgam and glass ionomer. They are usually presented as a premixed plastic material, which is light-cured to produce setting. Which one of the following is the liquid component of the unset material?

- (a) Aluminosilicate
- (b) Powdered glass
- (c) Quartz
- (d) Resin
- (e) Silica

50. During tooth restoration, an amalgam plugger is used to pack the mixed amalgam into a cavity while it is still in a plastic state. There are several aims in packing the amalgam into the cavity correctly. Which one of the following is not achieved by adequate packing?

- (a) Prevents recurrent caries
- (b) Produces a strong restoration
- (c) Produces a shiny surface
- (d) Raises excess mercury to the surface
- (e) Removes air pockets

51. Endodontic treatment involves various procedures on teeth. Which one of the following endodontic procedures involves a retrograde root filling?

- (a) Apicectomy
- (b) Open apex root filling
- (c) Pulp capping
- (d) Pulpectomy
- (e) Pulpotomy

52. While a crown is being manufactured in the laboratory, the dentist will need to fit a temporary crown over the prepared tooth. Which one of the following materials is not used in temporary crown construction?

- (a) Aluminium
- (b) Chrome cobalt
- (c) Plastic
- (d) Polycarbonate
- (e) Stainless steel

53. Missing teeth can be replaced by dentures, bridges or implants. What is the term for the branch of dentistry concerned with the replacement of missing teeth?
- (a) Endodontics
 - (b) Gerodontics
 - (c) Orthodontics
 - (d) Paedodontics
 - (e) Prosthodontics
54. Glass ionomer cements have many uses in dentistry, including as a cavity lining material. Which one of the following is the most likely reason for the material to be used as a lining in a deep cavity?
- (a) Adhesive to enamel
 - (b) Compatible with filling material
 - (c) Forms secondary dentine
 - (d) Non-irritant
 - (e) Strong
55. A bridge is a fixed restoration that replaces one or more missing teeth, and is composed of retainers and pontics. Which one of the following bridges is one where the retainers are on only one side of the pontic and adjacent to each other?
- (a) Acid etch
 - (b) Fixed-fixed
 - (c) Fixed-moveable
 - (d) Simple cantilever
 - (e) Spring cantilever
56. During root canal therapy, the dentist will use various specialised endodontic instruments to carry out each stage of the treatment. Which one of the following instruments is used to enlarge the root canal in a circular fashion?
- (a) Barbed broach
 - (b) Finger spreader
 - (c) Gates Glidden drill
 - (d) Hand file
 - (e) Hand reamer
57. When a patient has intrinsically discoloured anterior teeth, the dentist has several restorative options to improve the aesthetics of these teeth. Which one of the following techniques is most likely to be used in young adult patients?
- (a) All ceramic crowns
 - (b) Full gold crowns
 - (c) Porcelain bonded crown
 - (d) Porcelain inlays
 - (e) Porcelain veneers

58. The Maryland bridge is a type of fixed restoration used to replace missing anterior teeth in particular. What is the advantage of this type of bridge over more conventional bridges?
- (a) Can be made of porcelain only
 - (b) Conserve tooth tissue
 - (c) Do not dislodge
 - (d) Do not fracture
 - (e) Do not require luting cement
59. During denture construction, the patient will attend for a trial insertion of the dentures, with the teeth set up in wax rims. Which one of the following instruments is used for fine wax adjustment at this stage?
- (a) Articulator
 - (b) Fox's plane
 - (c) Le Cron carver
 - (d) Plaster knife
 - (e) Wax knife
60. Following surgery for oral cancer, an anatomical defect may be left in the patient's oral cavity, which can be successfully closed by wearing a special appliance. Which one of the following terms describes this type of appliance?
- (a) Functional appliance
 - (b) Immediate denture
 - (c) Obturator
 - (d) Overdenture
 - (e) Partial denture
61. From time to time, a full denture may gradually lose its fit and become uncomfortable for the patient to wear, so that use of a soft lining is required. This lining will be worn temporarily while a functional impression is recorded. Which one of the following materials is used for this technique?
- (a) Alginate
 - (b) Green composition
 - (c) Impression paste
 - (d) Pink wax
 - (e) Slow-cure acrylic
62. Missing teeth may be replaced by the use of implants, either to hold dentures or bridges in place, or to directly act as the root of a missing tooth. Which one of the following terms describes the method of bony retention of the implant?
- (a) Adhesion
 - (b) Alveoplasty
 - (c) Conditioning
 - (d) Implantation
 - (e) Osseointegration

63. During root canal therapy, the dentist will regularly irrigate the canal with a side-bevelled needle and syringe in order to wash out debris from the canal. Which one of the following is the reason that the needle is side-bevelled?
- (a) Better force of irrigation
 - (b) Faster irrigation
 - (c) Prevents apical injection
 - (d) Prevents backwash
 - (e) Reduced force of irrigation

Extended matching questions

Restorative treatment

For each of the following restorative treatment questions, select the single most appropriate item from the option list. Each option might be used once, more than once, or not at all.

- (a) Aspirator tip
- (b) Ball burnisher
- (c) Cotton pledget
- (d) Finishing strip
- (e) FG fissure bur
- (f) FG tapered bur
- (g) LG rosehead bur
- (h) Miller's forceps
- (i) Pop on mandrel
- (j) Retraction cord
- (k) Rubber dam
- (l) Siqveland matrix outfit
- (m) Spoon excavator
- (n) Wooden wedge

1. A 23-year-old female office assistant attends the practice with a chipped tooth, which had been caught on a wine glass the previous evening. On examination, the dentist discovered a mesio-incisal fracture of the upper left central incisor, which was restored using an acid etch composite technique. Which one of the options listed is used to ensure that the restoration has no interproximal overhang?
2. A young adult male patient attends for dental treatment, complaining of hot, cold and sweet sensitivity in the upper left sextant. A diagnostic radiograph reveals distal caries in the upper left second premolar tooth. Following local anaesthetic administration, the dentist will need to gain initial access to the lesion. Which one of the options listed is most appropriate for this purpose?

3. A 44-year-old office worker is undergoing the restoration of a Class II cavity in the lower left first molar tooth. The old filling material has been completely removed, the cavity has been cleared of recurrent caries and lined ready for restoration. Which one of the options listed is used to help avoid marginal overhangs during placement of the filling?

Endodontics

For each of the following endodontic clinical scenarios, select the single most appropriate instrument or item of equipment from the option list. Each option might be used once, more than once, or not at all.

- (a) Apex locator
- (b) Barbed broach
- (c) Finger spreader
- (d) Gates Glidden drill
- (e) Gutta percha point
- (f) Hand file
- (g) Hand reamer
- (h) Paper point
- (i) Plain broach
- (j) Ruler
- (k) Spiral filler

1. The dentist is carrying out a pulpectomy procedure on the upper left lateral incisor. The pulp chamber has been accessed and the contents removed, and the diagnostic working length of the canal is being determined. Which one of the options listed may be used for this procedure to avoid X-ray exposure?
2. A second-stage root canal therapy procedure is about to be completed by the dentist. The previously infected tooth is now clean and disinfected, and the dentist has chosen the gutta percha point to obturate the canal. Which one of the options listed is used to place the canal sealer?
3. The dentist is carrying out a first-stage root canal therapy procedure on the upper left first molar tooth. The existing amalgam filling has been removed and the location of the three root canals has been determined using a plain broach. Which one of the options listed is used to open the canal entrances fully, before débridement begins?

Prosthodontics

For each of the following prosthodontic clinical scenarios, select the single most appropriate item or instrument from the option list. Each option might be used once, more than once, or not at all.

- (a) Articulating paper
- (b) Carborundum stone
- (c) Friction grip finishing bur
- (d) Friction grip inverted cone bur
- (e) Friction grip tapered diamond bur
- (f) Gingival retraction cord
- (g) Greenstick compound
- (h) Latch grip stainless steel rosehead bur
- (i) Pressure relief paste
- (j) Wax knife

1. An elderly patient is attending for the bite registration stage of her full dentures. The wax has been suitably warmed and the rims inserted in the patient's mouth, but the facial height is too large. Which one of the options listed is required to adjust the rims?
2. A patient has had a two unit spring cantilever bridge cemented on the upper left canine tooth, to replace the missing upper left lateral incisor. On closing into normal occlusion, the patient reports discomfort in the lower anterior teeth. Which one of the options listed is required to adjust the bite?
3. A patient is attending for the initial impressions for a new upper acrylic partial denture. The stock trays available for the procedure are too shallow to record the dental arches fully, and will need extending to produce satisfactory impressions. Which one of the options listed is used for this purpose?
4. A patient is attending for a porcelain bonded crown preparation procedure of the lower left first premolar tooth. The tooth must be accurately prepared to avoid the production of any undercuts, otherwise the restoration will not seat fully onto the tooth. Which one of the options listed is used by the dentist to ensure that tooth preparation is correct?

Answers

Multiple choice questions

1. *Correct answer: a.* The crown has a premature contact, so when the patient tries to close there is excess pressure put on this point, resulting in discomfort of the tooth. The high spot needs locating for the dentist to be able to selectively adjust the occlusion of the crown and resolve the problem. Articulating paper is placed over the crown so that when the patient bites together, the high spot will be revealed as a coloured point on the crown surface. This can then be adjusted using finishing burs. None of the other options listed are suitable for this purpose.
2. *Correct answer: a.* A barbed broach is the hand instrument inserted into the root canal to extirpate the pulp contents. The barbs along its length hook into the tissue as the broach is twisted within the canal. A Gates Glidden drill may be used to gain initial access to the canal, or to remove gutta percha material already present, but it is not designed for pulp removal. Hand files are used to file the inner surface of the canal once the pulp has been removed, and both finger spreaders and rotary paste fillers are used during the root filling procedure.
3. *Correct answer: e.* Abrasion cavities tend to occur at the cervical necks of the buccal and labial surfaces of the teeth, and are usually caused by excessive force and sawing actions while toothbrushing. Lesions in this position are referred to as Blacks class V cavities.
4. *Correct answer: d.* Glass ionomers are the only restorative material that release fluoride, and are widely used to restore deciduous teeth for this reason. Their aesthetics are inferior to composites as they cannot be highly polished; they are also weaker than composites, and both materials are adhesive to enamel.
5. *Correct answer: d.* During a pulpotomy procedure, the contaminated pulp tissue in the chamber is removed, and the uncontaminated pulp in the root canal is sealed over with calcium hydroxide so that it retains its vitality. The material stimulates the formation of secondary dentine over the top of the root canal, and the tooth should be able to continue and complete its root growth and apex formation.
6. *Correct answer: b.* The inorganic filler may be powdered glass, quartz, silica or other ceramic particles, but all composite materials contain it, in one form or another. It provides strength to the set material and reflects light in a similar way to the crystal structure of enamel, providing good aesthetics. Calcium hydroxide is not a constituent of any permanent filling material. The combination of materials in all the other options listed are not found in composites.

7. *Correct answer: b.* Although alginate is used to take an impression of the opposing arch when fixed restorations are to be constructed, it is not accurate enough nor does it have adequate dimensional stability to be used as the impression material for the working model. Any of the other options listed are suitable impression materials for this purpose.
8. *Correct answer: b.* A carborundum stone is used to remove high spots on the teeth of the completed denture, as an alternative to an acrylic trimming bur. The stone removes excess material more gently than the stainless steel bur, but adjusted areas should always be polished smooth once any necessary adjustments have been completed. All the other options listed are items required for earlier stages of denture construction, but not for the fit stage.
9. *Correct answer: c.* Gates Glidden drills are available in a range of sizes, and can be used to drill through the pulp chamber floor and gain initial access to the root canals. The barbed broach is used to extirpate the pulp contents, the hand file to shape and contour the canals, and the finger spreader and rotary paste filler are used while placing the root filling.
10. *Correct answer: d.* A Class II cavity is one involving two or more surfaces of a posterior tooth, and the restoration will therefore require the use of a matrix outfit to construct and maintain the contact point of the restoration with the surface of the neighbouring tooth. None of the other options listed are suitable alternatives for this stage of the restoration placement.
11. *Correct answer: c.* Slow handpieces for routine use run at around 40 000 rpm, and are driven by air or electric motors at the base of the handpiece. Special attachments are available to produce a slowed speed of revolution for use during endodontic treatment, when the canal preparation is carried out mechanically rather than by hand.
12. *Correct answer: b.* Although zinc oxide and eugenol can be used as a sedative base beneath amalgam restorations, it is not suitable for use beneath composites, as the eugenol content of the cement prevents the resin binder from setting. If used in these circumstances, the composite restoration will fail. All the other options listed are accepted uses of zinc oxide and eugenol cement, in one product or another.
13. *Correct answer: d.* Impression paste is a modified form of zinc oxide and eugenol, with plasticisers added to improve its malleability as an impression material. When set, the material is hard and non-elastic, and is therefore unsuitable for use in reproducing undercuts. For this reason, it cannot be used for partial denture construction, as the set impression would fracture when being removed from all the undercuts present around the standing teeth; its use is therefore confined to full denture construction. All the other options listed are suitable as impression materials for partial denture construction.
14. *Correct answer: a.* The placement of calcium hydroxide over a pinpoint pulp exposure is a technique called pulp capping. The aim is to seal off the

pulp tissues from contamination by the rest of the oral cavity, and to stimulate the formation of a secondary dentine 'bridge' over the exposure site, so that the tooth remains vital and does not require root canal therapy. None of the other options listed are materials that will stimulate the formation of secondary dentine.

15. *Correct answer: e.* The rotary paste filler is used with the slow handpiece and it is smeared through the mixed sealant material so that a layer is collected onto it. Once in place at the canal entrance, the handpiece is operated as the paste filler rotates and is gently partially inserted into the top of the canal. The collected sealant material will spin off the instrument and into the canal, coating the walls and preparing it for the insertion of the gutta percha points. All the other options listed are endodontic instruments, but are not suitable for this stage of the procedure.
16. *Correct answer: c.* Phosphoric acid at a concentration of 33% is the typical material used as an acid etchant during a composite restorative procedure. The other acids listed are not suitable for this purpose. Hydrogen peroxide is used in some oral healthcare and tooth whitening products, and sodium hypochlorite is a powerful disinfectant.
17. *Correct answer: b.* A Briault probe is specifically designed to be used interproximally on the posterior teeth in order to detect cavities and softened enamel in these areas. Their two tips are angled so that they can probe both the mesial and distal surfaces of the posterior teeth, while being held from the front of the oral cavity. The sickle and straight probes cannot be used easily in this way, and the other two options listed are used for probing periodontal pockets rather than teeth.
18. *Correct answer: b.* The calcium content of this lining material stimulates odontoblasts to lay down secondary dentine, a property that no other lining material possesses. All the other options listed are functions of various other lining materials, including calcium hydroxide.
19. *Correct answer: b.* Too little zinc oxide powder will produce a runny mix that will take longer than usual to set. All the other options listed will accelerate the setting time of the material.
20. *Correct answer: c.* Modern alloy powders contain up to 60% silver, with the remainder of the powder containing varying amounts of copper, tin and zinc. Mercury is the liquid metal that the alloy powder is mixed with to form the amalgam filling material itself. It is kept separate from the alloy powder until mixing time.
21. *Correct answer: d.* Pulpectomy is the correct term for root canal therapy – the complete removal of the pulp contents from the tooth, before a root filling is placed. Pulpotomy is the term used when the pulp contents are removed from the pulp chamber only, and not the canal. Open apex root filling is carried out on immature permanent teeth to encourage the closure of the

apical foramen, so that a conventional root filling can be placed at a later date. Pulp capping is the sealing of a pinpoint pulp exposure to maintain the vitality of the tooth, and apicectomy is the surgical amputation of the apex of a root.

22. *Correct answer: d.* A correctly functioning curing light can set composite filling material to a depth of 2.0 mm. This can be tested by placing a measured amount of the material on a glass mixing slab and curing it from the top surface. The bottom surface of the composite can be viewed through the slab to ensure it has set correctly.
23. *Correct answer: b.* By definition, a Class II cavity is one involving two or more surfaces of a posterior tooth, including either the mesial or distal surface, and the occlusal surface. A Siqveland matrix outfit (or a Tofflemire matrix outfit) is required to be placed around the tooth involved to allow the cavity to be correctly filled.
24. *Correct answer: d.* The eugenol content of this cement acts to calm the nerve fibres within the dentine tubules, so that the tooth is allowed to settle fully. Although all the other options are suitable materials to be placed within the cavity, only zinc oxide and eugenol cement has this sedative effect on the nerve fibres.
25. *Correct answer: e.* The use of hand instruments at this point allows the dentist to have a much greater level of tactile sensation than is possible using handpieces and burs, so the softened dentine can be removed in tiny amounts without exposing the pulp chamber beneath. None of the three other hand instrument options listed are suitable for this purpose.
26. *Correct answer: b.* Cottonwool rolls are usually placed in the sulcus regions of the oral cavity in order to soak up residual saliva as well as to hold soft tissues away from the tooth that is under treatment. During caries removal, huge volumes of water are released from the dental handpiece and the cottonwool roll would become soaked and ineffective in a matter of seconds. They can also become snagged on the burs in some cases, which can be quite dangerous. All the other options listed are moisture control methods suitable for use during cavity preparation procedures.
27. *Correct answer: d.* Air turbine handpieces have a motor driven by compressed air, and operate at an optimum speed of 500 000 rpm. They are used with friction grip diamond and tungsten carbide burs to cut easily through enamel, dentine and filling materials during various tooth preparation procedures. Slower speeds would result in the handpiece motor stalling when cutting into particularly hard substances.
28. *Correct answer: d.* Endodontic hand files are inserted into the root canals, twisted slightly and then pulled out of the canal while maintaining contact with its inner wall. This action cuts into the wall and scrapes out a layer of contaminated dentine on each stroke, so débriding the canal and shaping and contouring it before root filling. All the other options listed are used for

various tasks during root canal therapy, but not to remove contaminated dentine.

29. *Correct answer: d.* A luting cement is one used to permanently fasten a fixed restoration, such as a crown or veneer, to a tooth. It must be adhesive to dentine so that it effectively 'glues' the prefabricated restoration into place. Zinc oxide and eugenol cement is not adhesive to dentine and is therefore unsuitable for this purpose. All the other options listed are suitable materials for use as luting cements.
30. *Correct answer: c.* All permanent crowns are constructed in a laboratory, using a cast of the prepared tooth made from the working impression taken after tooth preparation. To fit over the prepared tooth correctly while still being retentive, tooth preparation must result in near-parallel sides with no undercuts. The only bur shape able to achieve this, when used correctly, is the tapered diamond bur. As both enamel and dentine are cut during the crown preparation procedure, the air turbine handpiece is used so the bur needs to be a friction grip design.
31. *Correct answer: d.* A prolonged mixing time of the alloy powder with the mercury liquid within the capsule results in a mix of amalgam that will contract during setting, thereby allowing recurrent caries to develop because the filling material leaves microscopic gaps between itself and the cavity walls. The force of vibration of the amalgamator machine is set by the manufacturer, so excess or inadequate amalgamation is not an issue. Saliva contamination and inadequate mixing time both tend to result in expansion of the amalgam.
32. *Correct answer: e.* The post dam is a ridge formed in the finished denture that follows its posterior border and which sits slightly embedded in the palatal soft tissues. This prevents the saliva film beneath the fitting surface of the denture from washing out, and allows the surface tension of the liquid saliva to act as a retaining force between the denture and the palate. All the other options listed are structures found on a denture, but have different functions than this described.
33. *Correct answer: c.* Glass ionomer materials release fluoride into the surrounding tooth structure, unlike all other restorative materials. Fluoride is a key ion used to increase the resistance of a tooth to carious attack, by becoming incorporated into the crystal structure of enamel as fluoroapatite. This makes the tooth more resistant to demineralisation following acid attack, and therefore reduces the incidence of caries in that tooth. None of the other options listed are materials that release fluoride and have this cariostatic potential.
34. *Correct answer: b.* The rough edge will require smoothing with a fine bur to remove it. The stainless steel bur will leave an equally rough surface as that already present and, as the composite material is already set, neither the burnisher nor the carver will be capable of adjusting it. Miller's forceps are

used to hold articulating paper in place while checking the occlusion of restorations, but as the rough edge has already been located they are of no use in this case.

35. *Correct answer: b.* The finger spreader is an endodontic hand instrument inserted into the root canal after each gutta percha point has been placed. Its purpose is to press the gutta percha tightly into the canal lengthways, condensing it so that additional points can be inserted. This ensures that no air spaces remain within the canal for bacteria to re-infect the tooth. The procedure is called obturation.
36. *Correct answer: d.* The phosphoric acid content of the material produces a low pH, which can be irritant to the pulp in deep cavities. In these circumstances, a lining of calcium hydroxide would be placed beneath the zinc phosphate cement, or better still a non-irritant material would be used, such as zinc oxide and eugenol. Zinc phosphate cement is suitable for all the other options listed.
37. *Correct answer: b.* Of all of the permanent filling materials available, glass ionomer cements are the weakest at withstanding occlusal forces, and are therefore unlikely to be used for the restoration of Class II cavities in posterior teeth. Amalgam, composite or prefabricated inlays are more suitable restorative materials in these situations. Glass ionomer cements are suitable for use in all the other options listed.
38. *Correct answer: c.* The burnisher was originally designed to adapt the thin margins of gold restorations to the tooth surface, but is of equal use in compressing the edges of plastic filling material to the cavity outline. The amalgam plugger is used during the insertion of the filling to compress each increment deep into the cavity, so removing any air spaces. The Ward's carver is used to shape the filling surface and remove excess material from it. The other two options listed are not suitable instruments for adapting the material to the cavity.
39. *Correct answer: b.* Although calcium hydroxide cement is a very versatile material, it is not adhesive to tooth tissues and is therefore unsuitable as a luting cement. Luting cements are used to 'glue' fixed restorations, such as crowns, bridges and veneers, onto teeth, and they must be adhesive to dentine to perform this function. Calcium hydroxide cement can be used for all the other treatment options listed.
40. *Correct answer: c.* Zinc eugenol has a strong sedative effect on nerve tissue, and although the pulp contents have been removed during the root canal therapy procedure, microscopically there will be nerve tissue at the apical foramen of the tooth which may be sensitive. In addition, when used in this format the material will not set inside the root canal, and is easily removed at the next appointment, unlike all but calcium hydroxide of the other options listed. Calcium hydroxide is used in endodontics to encourage the laying

down of secondary dentine and calcium bridges, rather than as an antiseptic dressing.

41. *Correct answer: a.* Amalgam is not adhesive to any dental tissues, and when used as a restorative material it relies entirely on the presence of undercuts in the cavity to remain in place. Composite and glass ionomer materials are both adhesive to enamel, and glass ionomer is also adhesive to dentine and cementum. Porcelain and gold may be used as prefabricated inlays to restore a tooth, but rely on an adhesive luting cement to stay in place. They cannot be seated correctly if undercuts have been introduced into the cavity design.
42. *Correct answer: e.* The inlay needs to fit accurately into the cavity shape, with the prepared walls as near parallel as possible to give maximum retention. The presence of undercuts in the cavity would be recorded in the working impression and the model cast from it. At the fit appointment, the solid inlay would not be able to be seated fully, as the deeper sections of the restoration would be wider than the surface because of the presence of the undercuts. All the other options listed may be used for both an inlay and a filling.
43. *Correct answer: a.* The majority of modern amalgam materials contain a 'high copper' alloy mix of powder, as this has been shown to be superior in resisting both discoloration and marginal ditching of the set filling. Mercury is not a constituent of the alloy powder, and varying any of the other three options has no effect on the subsequent level of discoloration of the filling.
44. *Correct answer: a.* Cermet is the correct term for these specialised glass ionomer materials, which have had metals such as silver added to them to improve their set strength. They are ideal as core build-up materials as they are adhesive to all the calcified tooth tissues, so little tooth structure is lost during their placement. Compomers are composed of a combination of composite and glass ionomer, and are used for fissure filling techniques. Conditioners are liquids such as polyacrylic acid that are used during the placement of glass ionomer restorations to improve the marginal seal of the material. Compoules are preloaded capsules of composite available with a gun device for ease of placement during tooth restoration.
45. *Correct answer: c.* The aim of the open apex root filling technique is to encourage the further closure of the apical foramen to a more normal size, so that conventional root filling can eventually be carried out using gutta percha points. If these were placed while the apex was still wide open, they would easily pass through and into the surrounding apical tissues, making failure of the procedure more likely. Calcium hydroxide stimulates the formation of a calcium bridge in the apical region, so that the foramen effectively closes.
46. *Correct answer: a.* The amalgam carrier is a spring-loaded gun that is used to collect the mixed plastic amalgam material from the capsule and place it in the cavity by increments. As the amalgam has been compressed into the carrier during collection, it remains in place safely before being deposited in the cavity

by activation of the spring-loaded handle of the carrier. It is unusual for any material to drop out of this device accidentally. None of the other options listed are suitable for safely transporting the amalgam to the cavity and placing it there.

47. *Correct answer: d.* Gingival retraction cord is similar to a piece of thin string which has been soaked in an astringent such as adrenaline. When placed into the gingival crevice around the prepared tooth, the astringent causes the immediate tissues to shrink away from the tooth, so that a small gutter is created. The cord is removed immediately before the impression is taken, so that the impression material can run into this gutter and accurately record the margins of the preparation. None of the other options listed are suitable for this purpose.
48. *Correct answer: a.* The eugenol content of this cement has a strong sedative effect on nerve tissue, making it invaluable in calming hypersensitive pulps and helping to settle teeth with deep cavities. Calcium hydroxide lining material is able to promote the formation of secondary dentine. The remaining three options listed are properties of several other lining materials.
49. *Correct answer: d.* All composite materials consist of inorganic fillers in a resin binder. The resin is the liquid component of the material and is activated to set hard when exposed to the curing light. The inorganic filler may be one of several materials, such as powdered glass, quartz or silica. Aluminosilicates are the glass-like component of glass ionomer cements.
50. *Correct answer: c.* The aim of adequately packing the plastic amalgam into the cavity, called condensing, is to remove all air spaces from the material so that a strong restoration is produced, while encouraging any excess mercury in the mix to rise to the surface for removal during surface carving. Elimination of the air spaces also prevents recurrent caries from developing, as bacteria cannot re-enter the cavity. A shiny surface to the restoration is produced by polishing, once the material has set fully after several hours.
51. *Correct answer: a.* A retrograde root filling is one that is placed from the apical end of the tooth, rather than from the crown surface. This latter technique is carried out during conventional root filling procedures, and is called an orthograde root filling. The only technique listed where access to the apex of the tooth is available for a retrograde root filling technique is an apicectomy.
52. *Correct answer: b.* Chrome cobalt is a hard metallic alloy that is used in denture construction. The majority of temporary crowns are made of either plastic or polycarbonate, but harder wearing types for long-term use on deciduous teeth are made of aluminium or stainless steel.
53. *Correct answer: e.* The term comes from ‘prosthetic’ – the surgical replacement of a missing body part with an artificial device – and ‘dontic’ –

relating to teeth. Endodontics is the root treatment speciality, gerodontics is concerned with dental care of the elderly, orthodontics is the speciality of correcting malaligned teeth, and paedodontics is concerned with the dental care of children.

54. *Correct answer: d.* The deeper the cavity, the closer any lining material will be to the pulp tissues. Any material used in this situation must therefore be non-irritant to these tissues, otherwise pulpitis may develop. All lining materials must be compatible with the filling material, and as no enamel will be present inside a deep cavity, the adhesiveness of glass ionomer to it is irrelevant in this case. Glass ionomer does not form secondary dentine, and lining materials do not need to be strong.
55. *Correct answer: d.* A cantilever bridge is defined as one which is retained on one side of the pontic only, and where those retainers are adjacent to the pontic it is a simple cantilever. When retainers are fitted to teeth further from the pontic, such as a premolar with an incisor pontic, the bridge is called a spring cantilever. Fixed bridges have retainers on either side of the pontic. Theoretically, an acid etch bridge may have retaining wings on one side of the pontic only, but not always so, as is the case with cantilevers.
56. *Correct answer: e.* Hand reamers are shaped like a conventional wood drill, with a circular cross-section of its inflexible length. They are used in a screw-like fashion to gradually enlarge the root canal so that a gutta percha point can be inserted into the circular hole created. As the majority of root canals are known to be oval-shaped rather than circular, the reamer has been superseded by flexible hand files which can better prepare the odd-shaped canals for root filling.
57. *Correct answer: e.* Once any of these fixed restorations have been provided, the underlying teeth will require permanent restoration for the patient's lifetime. It follows then that the minimal amount of tooth preparation should be undertaken each time, to preserve as much of the natural tooth structure as possible, for the longest time. Veneers involve the preparation of one tooth surface only, unlike crowns. Inlays are unsuitable restorations in this case, as they are placed within a cavity rather than over a tooth surface to mask discoloration.
58. *Correct answer: b.* Only minimal tooth preparation is required for any of the acid etch bridge techniques, such as the Maryland, in contrast to conventional bridges where each retainer tooth has to be reduced to a core shape. The Maryland bridge has metal retaining wings that require adhesion using a suitable luting cement, and acid etch bridges are the easiest of all to be dislodged. All bridges can fracture, unless they are constructed solely from metal.
59. *Correct answer: c.* Either the Le Cron carver or the wax knife are used for the adjustment of the wax component of the trial denture, but for fine

adjustment the smaller blade of the former is far superior to the bulky wax knife. The plaster knife is used to trim excess plaster from cast models. The other two options listed are not suitable items for wax adjustment.

60. *Correct answer: c.* The obturator is constructed from acrylic and is designed to plug any anatomical defect created by tissue removal during the cancer surgery. Any missing dentition will be incorporated into the design of the obturator, and it will be worn in the same way as a denture. Closure of the anatomical defect will allow normal speech and mastication for the patient, while preventing the area from becoming filled with food debris and fluids. A functional appliance is a type of orthodontic device for correcting jaw relationships. The other three options are all types of dentures.
61. *Correct answer: e.* The material used for this purpose must have the property of setting over several hours rather than a few minutes, so that it records the soft tissues during normal oral function. This is how a comfortable and stable fit is produced. Pink wax would not set in the oral cavity, as the environment is too warm. As the name suggests, slow-cure acrylic sets over an extended time, whereas all the other options listed will set in minutes.
62. *Correct answer: e.* Once the implant has been inserted into the cavity created in the alveolar bone, either by drilling it out or by extracting a tooth and using the socket created, the bone tissue itself will gradually grow around and into the implant surface, eventually locking it rigidly into the jaw. The process is called osseointegration. None of the other options listed are alternative terms.
63. *Correct answer: c.* The side-bevel allows the irrigation fluid to wash out sideways from the needle tip, and rinse around the canal in a circular fashion rather than being squirted directly out towards the apex of the tooth, as would happen with a conventional needle. This is of particular importance when irrigation solutions such as sodium hypochlorite are used, as injection of this fluid in particular may cause intense pain and damage to the patient's soft tissues.

Extended matching questions

Restorative treatment

1. *Correct answer: d.* A finishing strip has a sandpaper-like surface on one side, and is available in various grades. It is threaded through the contact point of the adjacent teeth and drawn over the surface of the new filling interproximally, so that any overhang flashes of composite material are sanded away.
2. *Correct answer: e.* The friction grip fissure bur will have a diamond surface that can easily cut through enamel and dentine when used in the air turbine

handpiece. The tapered bur is for crown preparation, and the latch grip rosehead bur will be constructed of stainless steel, which cannot cut through enamel.

3. *Correct answer: l.* A Class II cavity is one involving two or more surfaces of a molar or premolar tooth, such as a mesio-occlusal cavity. The matrix outfits available for use in these situations are either Siqueland or Tofflemire designs, and the former is listed as an option.

Endodontics

1. *Correct answer: a.* An apex locator is a special electrical endodontic device that is inserted into the canal when determining the position of the apex of the tooth, and therefore its working length. The controls can be set to be between 0.5 and 2.0 mm of the apex on most styles of locator, and at the preset position it will either bleep or flash a light to indicate that the required depth has been achieved. Most require to be used in a dry field to be accurate, but an X-ray exposure is avoided for the patient nevertheless.
2. *Correct answer: k.* The item designed to specifically coat the inner walls of the canal with the sealant material is a spiral filler. It is used in the slow handpiece, and while stationary the sealant material is coated onto its spiral design. The tip is just inserted into the canal and then the handpiece is used to slowly spin the sealant off the filler and into the canal.
3. *Correct answer: d.* Gates Glidden drills are available in a range of six sizes, and at various lengths, and are used in the slow handpiece to gradually open the coronal section of each root canal. The canals are then easily located for hand files, hand reamers or special giromatic files to prepare their width and length before root filling. The drills have other uses too, such as gutta percha removal when placing a post in a previously root-filled tooth.

Prosthodontics

1. *Correct answer: j.* The wax knife can also be warmed and then used to remove shavings of wax from the top of one or both rims, until the face height produced is more acceptable.
2. *Correct answer: c.* Articulating paper will be used to locate the premature contact present, but the bite itself will be adjusted using the friction grip fine diamond finishing bur. The other two burs listed are unsuitable for this purpose.
3. *Correct answer: g.* The greenstick compound material is a type of hardened gutta percha, which can be gently warmed in a flame until softened and then moulded along the edges of the stock impression tray. When cooled again, this

will have built up the sides of the tray, and extended its length, so that a more accurate initial impression can be taken.

4. *Correct answer: e.* Tapered burs are specifically shaped to produce a near-parallel tooth preparation, with no undercuts. They are tapered from the shank end to the tip so that the correct shape is easily produced during tooth preparation.

6

Minor Oral Surgery, Local Anaesthesia and Anxiety Control

Multiple choice questions

1. A patient attends the surgery for the extraction of a grossly carious lower left third molar tooth. On examination, the dentist anticipates that the procedure will require a surgical approach, and is likely to use which one of the following instruments to protect the lingual nerve?
 - (a) Austin retractor
 - (b) Coupland's chisel
 - (c) Periosteal elevator
 - (d) Tissue dissecting forceps
 - (e) Warwick James' elevator
2. A gingivectomy procedure is to be carried out on an epileptic patient. The technique will involve the removal of hyperplastic gingival tissue from the buccal side of the upper left premolar teeth. Which one of the following nerves must be anaesthetised to allow the procedure to be carried out painlessly?
 - (a) Greater palatine nerve
 - (b) Inferior dental nerve
 - (c) Long buccal nerve
 - (d) Middle superior dental nerve
 - (e) Posterior superior dental nerve
3. All local anaesthetic cartridges have a variety of contents, besides the agent that prevents electrical activity of the nerves. Which one of the following constituents is added to ensure the contents do not cause local soft tissue irritation, by neutralising the pH of the solution?
 - (a) Anaesthetic
 - (b) Buffer
 - (c) Preservative
 - (d) Sterile water
 - (e) Vasoconstrictor

4. A 35-year-old man attends the surgery as a new patient for a routine dental examination, after relocating to the area 3 months previously. On examination, the dentist notices that the lower right third molar is not present orally, but the patient states that he has never had an extraction performed. A dental radiograph reveals the tooth is unerupted in the mandible and is surrounded by a radiolucent area coronally. Which one of the following lesions is most likely to be present?
 - (a) Dentigerous cyst
 - (b) Granuloma
 - (c) Lateral periodontal abscess
 - (d) Periapical abscess
 - (e) Squamous cell carcinoma
5. A patient attends the surgery for the surgical extraction of an impacted lower right third molar tooth. To carry out the procedure painlessly, the inferior dental nerve will require anaesthetising by the dentist. Which one of the following anatomical structures prevents damage to this nerve during correct administration of the local anaesthetic?
 - (a) Body of the mandible
 - (b) Coronoid process
 - (c) Lingula
 - (d) Ramus of the mandible
 - (e) Sigmoid notch
6. A 31-year-old pregnant patient attends the surgery for the removal of an epulis, which has formed labially in the region of the upper right canine tooth. Which one of the following local anaesthetic presentations must not be used for this procedure?
 - (a) Lidocaine 2%
 - (b) Mepivacaine 2%
 - (c) Mepivacaine 3%
 - (d) Prilocaine 3%
 - (e) Prilocaine 4%
7. A surgical procedure is to be carried out to remove the apical section of a retained root of an upper tooth. A periapical radiograph of the root shows that it is lying in contact with the floor of the maxillary antrum. Which one of the following teeth is most likely to be involved in this scenario?
 - (a) Upper canine
 - (b) Upper central incisor
 - (c) Upper first molar
 - (d) Upper first premolar
 - (e) Upper supernumerary
8. An elderly patient attends the surgery for an alveolectomy procedure of the lower alveolar ridge. Once a periosteal flap has been raised, the dentist will

remove any sharp spicules of bone so that future dentures can be worn comfortably. Which one of the following instruments is used for this procedure?

- (a) Austin retractor
- (b) Bone rongeurs
- (c) Coupland's chisel
- (d) Periosteal elevator
- (e) Tissue dissecting forceps

9. A patient attends the surgery following an unsuccessful repeat root filling of the upper left central incisor. A radiograph shows a distinct periapical area associated with the tooth, but the patient does not want an extraction performed. Which one of the following procedures is carried out to resolve the problem?

- (a) Alveolectomy
- (b) Apicectomy
- (c) Frenectomy
- (d) Operculectomy
- (e) Pulpectomy

10. Many patients who attend the surgery for dental treatment are nervous and require some form of anxiety control to enable them to undergo their treatment successfully. Which one of the following techniques is most likely to be used for children?

- (a) General anaesthesia
- (b) Hypnosis
- (c) Inhalation sedation
- (d) Intravenous sedation
- (e) Oral sedation

11. A 22-year-old patient attends for an operculectomy procedure involving the partially erupted lower left third molar tooth. In order for the procedure to be carried out painlessly, the dentist must ensure that which one of the following nerves is anaesthetised?

- (a) Greater palatine nerve
- (b) Inferior dental nerve
- (c) Long buccal nerve
- (d) Mental nerve
- (e) Posterior superior dental nerve

12. An adult male attends the surgery for the simple extraction of a fractured upper left canine tooth. Although fractured, the dentist will be able to remove the tooth by severing the periodontal ligament and slightly dilating the socket, without resorting to a surgical technique. Which one of the following instruments is used by the dentist for this procedure?

- (a) Bayonet forceps
 - (b) Coupland's chisel
 - (c) Left Cryer's elevator
 - (d) Luxator
 - (e) Upper left beaked forceps
13. Following the successful extraction of the lower right second molar tooth, a patient returns to the surgery 3 days later as an emergency. She is complaining of an aching pain at the extraction site and a bad taste in the mouth. Which one of the following is the most likely diagnosis in this instance?
- (a) Localised osteitis
 - (b) Oroantral fistula
 - (c) Primary haemorrhage
 - (d) Reactionary haemorrhage
 - (e) Surgical emphysema
14. All local anaesthetic cartridges have a variety of contents, besides the agent that prevents electrical activity of the nerves. Which one of the following constituents is added to prolong the activity of the anaesthetic?
- (a) Anaesthetic
 - (b) Buffer
 - (c) Carrying solution
 - (d) Preservative
 - (e) Vasoconstrictor
15. The anxiety control technique of inhalation sedation requires the patient to inhale a carefully controlled combination of two gases, oxygen and nitrous oxide. The coloured gas cylinders are fitted to a sedation machine or are piped directly into the surgery through colour-coded tubing. Which one of the following colours indicates a nitrous oxide cylinder?
- (a) Black
 - (b) Black with white shoulder
 - (c) Blue
 - (d) Blue with white shoulder
 - (e) White
16. A 20-year-old patient attends the surgery complaining of severe pain in the lower left quadrant and is unable to fully open his mouth to allow the dentist to carry out a dental examination. A dental panoramic tomograph shows the presence of an unerupted lower left third molar tooth, which is leaning towards the erupted second molar tooth. Which one of the following describes this type of tooth impaction?
- (a) Disto-angular impaction
 - (b) Horizontal impaction
 - (c) Mesio-angular impaction

- (d) Transverse impaction
 - (e) Vertical impaction
17. Following the successful amputation of the root apex of a lower lateral incisor tooth, the dentist proceeds to remove the remaining infected debris from the surgical site. Which one of the following instruments is used for this task?
- (a) Austin retractor
 - (b) Bone rongeurs
 - (c) Mitchell's trimmer
 - (d) Periosteal elevator
 - (e) Tissue dissecting forceps
18. A 17-year-old patient attends for the restoration of the lower left first molar tooth, by the preparation and placement of a full gold crown onto the tooth. As the tooth is fractured buccally, a crown lengthening procedure will also be carried out at the preparation stage. To ensure this first stage of the restorative procedure is carried out painlessly, the dentist must anaesthetise which pair of the following combinations of nerves?
- (a) Inferior dental and lingual nerves
 - (b) Inferior dental and long buccal nerves
 - (c) Lingual and long buccal nerves
 - (d) Long buccal and mental nerves
 - (e) Mental and lingual nerves
19. An 80-year-old patient attends the surgery with a grossly carious upper right second molar tooth, which is abscessed. Although in pain, the tooth cannot be extracted by the dentist at present because the patient's INR score is 5.5. Which one of the following medications is the patient most likely to be taking?
- (a) Aspirin
 - (b) Atenolol
 - (c) Diazepam
 - (d) Ramipril
 - (e) Warfarin
20. A 19-year-old female patient attends the surgery complaining of pain in the lower left quadrant, and has been unable to eat solid foods for 2 days. She has halitosis and is unable to open her mouth to allow a dental examination to be carried out. The dentist diagnoses pericoronitis, and is most likely to recommend which one of the following procedures if the condition recurs?
- (a) Alveolectomy
 - (b) Frenectomy
 - (c) Gingivectomy
 - (d) Operculectomy
 - (e) Pulpotomy

21. A 60-year-old patient attends the surgery for the simple extraction of the lower right second premolar tooth, which is periodontally involved and mobile. To ensure the procedure is carried out painlessly, the dentist must anaesthetise which pair of the following combinations of nerves?
- (a) Inferior dental and long buccal nerves
 - (b) Inferior dental and mental nerves
 - (c) Lingual and long buccal nerves
 - (d) Lingual and mental nerves
 - (e) Long buccal and mental nerves
22. A 13-year-old child attends the surgery with her mother, complaining of a noticeable gap between her upper central incisors. On examination, the dentist diagnoses the presence of a median diastema, and recommends a surgical procedure followed by orthodontic treatment to successfully close the gap. Which one of the following surgical procedures is being recommended by the dentist?
- (a) Alveolectomy
 - (b) Apicectomy
 - (c) Frenectomy
 - (d) Gingivectomy
 - (e) Operculectomy
23. A 33-year-old patient attends the dental surgery for the planned restoration of six teeth, using a combination of endodontic and filling techniques. The patient is a dental phobic, and has previously requested that anxiety control techniques are used to enable her to undergo the treatment successfully. On the day of the appointment, she presents with a respiratory infection. Which one of the following anxiety control techniques cannot be used in this instance?
- (a) Acupuncture
 - (b) Hypnosis
 - (c) Intranasal sedation
 - (d) Intravenous sedation
 - (e) Oral sedation
24. A 39-year-old patient attends the surgery for the extraction of the upper right lateral incisor tooth, which is palatally placed and now periodontally involved. To ensure the tooth is extracted painlessly, the dentist must anaesthetise which pair of the following combinations of nerves?
- (a) Anterior superior dental and greater palatine nerves
 - (b) Anterior superior dental and long buccal nerves
 - (c) Anterior superior dental and nasopalatine nerves
 - (d) Middle superior dental and greater palatine nerves
 - (e) Middle superior dental and nasopalatine nerves

25. During the routine dental examination of a 45-year-old male patient, the dentist notices a small ulcer on the lateral border of the patient's tongue. The patient reports that the lesion has been present for 2 months, and although it was initially smaller still, it does not bother him as it is painless. As the patient is a smoker, the dentist intends to refer him to the local hospital for further treatment. Which one of the following procedures is the patient likely to undergo?
 - (a) Alveolectomy
 - (b) Excisional biopsy
 - (c) Gingivectomy
 - (d) Gingivoplasty
 - (e) Incisional biopsy

26. The trigeminal nerve is the fifth cranial nerve and supplies the majority of the oral cavity. A branch of the mandibular division runs from the inner surface of the ramus of the mandible and then over the external oblique ridge to supply the surrounding gingivae. Which one of the following is the name of this branch?
 - (a) Incisive nerve
 - (b) Inferior dental nerve
 - (c) Lingual nerve
 - (d) Long buccal nerve
 - (e) Mental nerve

27. A 50-year-old patient attends the surgery for an apicectomy procedure on the upper left central incisor tooth. Once local anaesthesia has been applied and taken effect, the dentist will need to gain access to the root apex to carry out the procedure. Which one of the following instruments is used to raise a mucoperiosteal flap?
 - (a) Bone rongeurs
 - (b) Periosteal elevator
 - (c) Scalpel outfit
 - (d) Tissue dissecting forceps
 - (e) Tissue rake

28. A 46-year-old kidney transplant patient attends for the removal of hyperplastic gingivae overlying the upper right molar teeth. To ensure the procedure is carried out painlessly, the dentist must anaesthetise which pair of the following combinations of nerves?
 - (a) Greater palatine and middle superior dental nerves
 - (b) Middle and anterior superior dental nerves
 - (c) Middle and posterior superior dental nerves
 - (d) Nasopalatine and middle superior dental nerves
 - (e) Posterior superior dental and greater palatine nerves

Extended matching questions

Minor oral surgery procedures

For each of the minor oral surgery questions, select the single most appropriate procedure from the option list. Each option might be used once, more than once, or not at all.

- (a) Alveolectomy
- (b) Alveoplasty
- (c) Apicectomy
- (d) Excision biopsy
- (e) Frenectomy
- (f) Gingivectomy
- (g) Gingivoplasty
- (h) Incision biopsy
- (i) Operculectomy

1. A 20-year-old patient attends with a painful oral condition affecting the lower left gingivae and soft tissues adjacent to the partially erupted third molar tooth. The dentist gives oral health advice and has to prescribe a second course of antibiotics for the condition. A radiograph reveals that the tooth is almost fully erupted, but that the roots are close to the inferior dental nerve and extraction is not advised. Which one of the options listed is the most likely procedure to be carried out as an alternative?
2. A 60-year-old patient has had his final standing lower anterior teeth removed and is now preparing to have dentures provided for their replacement. The extraction procedure was difficult and several sharp socket edges are still present, which will prevent the new denture from settling comfortably. Which one of the procedures listed is carried out before the denture is constructed?
3. A 40-year-old patient suffering from epilepsy has attended for advice on improving her oral hygiene techniques, as she has noticed that her gums are swollen. The dentist determines that the problem is caused by her antiepileptic medication, but this cannot be changed without the risk of destabilising her epilepsy. Which one of the procedures listed is carried out to alleviate the oral health problems?

Answers

Multiple choice questions

1. *Correct answer: c.* Although not designed specifically for this use, the periosteal elevator is the surgical instrument that is invariably used to protect the lingual nerve during surgical extraction of lower third molars. Either of the blade ends can be pushed lingually between the tooth and the mucoperiosteal flap, so that during tooth sectioning or bone drilling the burs contact the instrument rather than the surrounding soft tissues. None of the other options listed are instruments that can be used in this way.
2. *Correct answer: d.* The middle superior dental nerve supplies the upper premolar teeth and the anterior half of the upper first molar tooth, and their respective buccal gingivae. The greater palatine nerve supplies the palatal gingivae of the relevant teeth, but not the teeth themselves.
3. *Correct answer: b.* A buffering agent is used to neutralise the pH of the fluids in the surrounding tissues by raising or lowering the pH to 7. The anaesthetic acts on the nerve cells themselves to prevent electrical stimulation, while the preservative prevents the solution from deteriorating and 'going off'. Sterile water is the carrier for all the constituents, and the vasoconstrictor acts to prolong the anaesthesia by shutting down the local blood vessels so that the solution is removed from the area more slowly.
4. *Correct answer: a.* A dentigerous cyst is an abnormal fluid-filled sac that encloses the crown of an unerupted tooth within it, and is also known as a follicular cyst. Its presence often prevents the normal eruption of the tooth. Cysts may also occur in association with erupted teeth, and are called apical cysts as they usually form in the periapical area of the root. None of the other options listed are associated with unerupted teeth.
5. *Correct answer: c.* The lingula is the bony projection over the mandibular foramen, on the inner surface of the ramus of the mandible. The nerve enters the foramen from behind and underneath the lingula, so that damage to the nerve by the needle tip should be avoided during the administration of the inferior dental nerve block.
6. *Correct answer: d.* This presentation contains the vasoconstrictor felypressin, which is the same drug given to pregnant women to induce labour. Theoretically, this local anaesthetic presentation could do the same and must therefore be avoided in pregnant patients. Prilocaine 4% contains no vasoconstrictor, and all the other options listed do not contain felypressin.
7. *Correct answer: c.* The roots of the upper molar teeth are very often associated with, or lie very close to, the floor of the maxillary antrum, and they should therefore be extracted with great care. A preoperative radiograph must always be taken before attempting any extraction, but especially so when these teeth

are involved. Anatomically, the maxillary antra do not tend to run further forwards than the upper second premolar teeth.

8. *Correct answer: b.* Bone rongeurs are used to nibble away any sharp bony projections on the top of the alveolar ridge, so that a smooth surface is produced that will allow future dentures to sit comfortably. A bone drill or bone file may also be used to the same effect. None of the other options listed are instruments that would be suitable for this purpose.
9. *Correct answer: b.* An apicectomy is the surgical amputation of the root apex, and is carried out when all attempts at root treatment have failed but the tooth is not to be extracted. An alveolectomy is the surgical removal of part of the alveolar process, a frenectomy involves the soft tissue flap called the frenum, an operculectomy is the surgical removal of the gingivae over an erupting tooth, and a pulpectomy is the removal of the pulp from a tooth.
10. *Correct answer: c.* This is a technique involving the controlled inhalation of a mixture of oxygen and nitrous oxide through a nasal hood, and is particularly useful with children as it is non-invasive, unlike intravenous sedation. General anaesthesia is not available in the dental surgery setting nowadays, and the other options listed are techniques more suitable for adult patients.
11. *Correct answer: c.* An operculectomy procedure is carried out to surgically remove the flap of skin, the operculum, that often lies over a lower third molar tooth as it erupts. The buccal soft tissues in this area are supplied by the long buccal nerve, while the tooth itself is supplied by the inferior dental nerve.
12. *Correct answer: d.* This is a description of the exact use of a luxator during a tooth extraction procedure. Only the bayonet forceps are an alternative for the extraction of this tooth from the options listed, but they are used to grip the root and twist it in the socket, so severing the periodontal ligament.
13. *Correct answer: a.* This is a complication of extraction also known as a 'dry socket', where the blood clot has been lost or broken down, allowing an infection to develop in the socket itself. It always occurs around 3 days after extraction and is very painful. Haemorrhage is not painful, and surgical emphysema is the presence of air in the tissues caused by the use of an air turbine during surgical procedures. An oroantral fistula can only occur in association with the upper posterior teeth.
14. *Correct answer: e.* The anaesthetic acts on the nerve cells themselves to prevent electrical stimulation, while the preservative prevents the solution from deteriorating and 'going off'. Sterile water is the carrier for all the constituents, and the vasoconstrictor acts to prolong the anaesthesia by shutting down the local blood vessels so that the solution is removed from the area more slowly. The buffering agent maintains the pH of the solution, so that it is not irritant to the tissues during injection.

15. *Correct answer: c.* The colour coding of the cylinders and pipes is one of several safety features of the inhalation sedation machine, ensuring that patients cannot be given an overdose of the anaesthetic gas. No other colour combination is used for nitrous oxide equipment.
16. *Correct answer: c.* A vertical or a disto-angular impaction would show the third molar impacted into the ramus of the mandible, to a greater or lesser angle. A horizontal impaction occurs when the tooth is lying on its side along the dental arch, while a transverse impaction is when the tooth is lying across the dental arch.
17. *Correct answer: c.* This is a surgical instrument with a spoon-shaped end that is ideal for scooping out any remaining pathological debris from the surgical site during this procedure. None of the other options listed are suitable instruments for this task.
18. *Correct answer: b.* The tooth is supplied by the inferior dental nerve and the buccal soft tissues of the lower molars are supplied by the long buccal nerve. The lingual nerve does not require anaesthetising as the crown lengthening procedure does not involve this side of the tooth.
19. *Correct answer: e.* Warfarin is an anticoagulant drug that is prescribed to patients to avoid strokes, deep vein thromboses and pulmonary emboli. The effect of the drug on the patient's blood clotting ability is monitored by regular blood tests to determine their International Normalised Ratio (INR). If this is found to be too high at any time, the patient is at risk of uncontrolled bleeding following events such as a simple tooth extraction, so treatment may sometimes need delaying or the patient may have to be referred to hospital instead.
20. *Correct answer: d.* This procedure is carried out to surgically remove the flap of skin overlying a partially erupted tooth, which becomes infected during an episode of pericoronitis. It is performed when the infection recurs several times with the same tooth, despite the best efforts of the patient and dentist to prevent it.
21. *Correct answer: d.* The tooth and its buccal soft tissues are supplied by the inferior dental nerve, which emerges from the mental foramen of the mandible as the mental nerve. The lingual soft tissues are supplied by the lingual nerve. None of the other options listed have the correct combination of tooth and soft tissue nerve supplies for this tooth.
22. *Correct answer: c.* A frenectomy is the surgical removal of the frenal tissue, which in this case runs from the midline of the upper alveolar process to the inner side of the top lip. When excessive fibrous tissue is present in the frenum, it tends to prevent the upper central incisor teeth from lying in contact with each other, and the gap produced between them is called a median diastema. Orthodontic treatment alone to close the gap tends to fail, as the teeth bounce apart again once the orthodontic appliance is removed.

23. *Correct answer: d.* The drug midazolam is used for intravenous sedation, but its side-effects include reduction in respiratory rate and depth of breathing. If this drug is given to a patient with a respiratory infection, respiratory ability will be severely reduced, to the point where the patient could actually stop breathing. None of the other options listed have this profound effect on the respiratory system.
24. *Correct answer: c.* The upper incisors and canine teeth and their labial soft tissues are supplied by the anterior superior dental nerve, and the palatal soft tissues of the incisors are supplied by the nasopalatine nerve.
25. *Correct answer: b.* Persistent lesions of this nature must always be investigated, especially when they occur in patients with known risk factors for oral cancer, such as smoking. As the ulcer is still small, its full removal during an excisional biopsy will be the treatment of choice, rather than its partial removal during an incisional biopsy. If the pathology results confirm a diagnosis of cancer, the patient will have to undergo a second surgical procedure if only part of the lesion was removed initially.
26. *Correct answer: d.* The incisive nerve is a branch of the maxillary division of the trigeminal nerve. Of the other four options listed, only the long buccal and the lingual nerves run outside the body of the mandible. The lingual nerve runs along the inner border of the mandible, next to the tongue, while the long buccal nerve follows the anatomical path described.
27. *Correct answer: b.* The raising of mucoperiosteal flaps is the main use of this instrument, although it does have others. The tissue rake is used to retract the flap once it has been raised, and none of the other options listed are suitable instruments for flap raising.
28. *Correct answer: c.* The upper first molar tooth and its buccal soft tissues are supplied anteriorly by the middle superior dental nerve, and posteriorly by the posterior superior dental nerve. The second and third molar teeth and their buccal soft tissues are supplied by the posterior superior dental nerve.

Extended matching questions

Minor oral surgery procedures

1. *Correct answer: i.* Operculectomy is the surgical removal of the flap of gingival tissue, called the operculum, overlying a partially erupted tooth. It is a routine procedure used to avoid recurrent infection of the soft tissue as the tooth erupts, infection being caused by trauma from the opposing teeth and then by poor oral hygiene of the sore area. The procedure can be carried out with a scalpel, but is often performed using an electrocautery unit so that haemostasis is immediate.
2. *Correct answer: a.* Removal of the sharp socket edges, using either bone rongeurs or a surgical drill, is the procedure of alveolectomy. Selective shaping

of the alveolar process, such as to smooth out a deep undercut area, is called alveoplasty.

3. *Correct answer: f.* The careful removal of hyperplastic gingival tissue, following the gingival contour of the teeth, is called gingivectomy. It can be carried out using a specialised 'Blake' gingivectomy knife, so that the blade angulation is correct, or freehand with an ordinary scalpel blade. Contouring of the gingivae, rather than tissue removal, is referred to as gingivoplasty.



Domain 2: Professionalism

Multiple choice questions

1. A patient attends the dental surgery with a fractured upper left first molar tooth, which requires treatment. The patient has come straight from his place of work and is still wearing his work overalls, and confirms that he is a dustman. The dentist advises the patient to have the tooth extracted and does not mention the option of crowning the tooth. Which one of the following GDC Standard key principles has the dentist failed to follow?
 - (a) Be trustworthy
 - (b) Cooperate with others
 - (c) Protect patient confidentiality
 - (d) Put patients' interests first
 - (e) Respect patients' dignity and choices
2. Over a 5-year cycle, the dental nurse must complete a minimum of 50 hours of verifiable Continuing Professional Development, including set minimum hours in 'core subjects'. Which one of the following is not a 'core subject'?
 - (a) Complaints handling
 - (b) Infection control
 - (c) Medical emergencies
 - (d) Radiological protection
 - (e) Reception and management
3. One of your dental nurse colleagues tells you that she is concerned that another nurse appears to be taking shortcuts with infection control procedures, and is not following the workplace policy correctly. Which one of the following GDC Standards would you refer to for guidance in addressing the issue?
 - (a) Delegation
 - (b) Registration
 - (c) Relationships
 - (d) Reporting
 - (e) Responsibility

4. In some situations, a dental nurse may be unsure whether a colleague's actions or omissions are serious enough to raise a concern. Which one of the following organisations specifically provides confidential advice on these types of issues?
 - (a) Business Services Authority
 - (b) Care Quality Commission
 - (c) Health and Safety Executive
 - (d) Healthcare Commission
 - (e) Public Concern at Work
5. The practice manager has asked you to start recording the hours you spend reading dental journals. She correctly believes that this record will help you in your future career once you have passed your exam. Which one of the following GDC Standards is she referring to?
 - (a) Delegation
 - (b) Registration
 - (c) Relationships
 - (d) Reporting
 - (e) Responsibility
6. A registered dental nurse has been asked to attend a Basic Life Support course, with the objective of obtaining a certificate of competence in this topic. Which one of the following GDC Standards is most relevant to this attendance?
 - (a) Be trustworthy
 - (b) Cooperate with team members
 - (c) Maintain professional knowledge
 - (d) Protect confidentiality
 - (e) Respect patients' dignity and choices
7. Over a 5-year cycle, the dental nurse must complete a minimum of 50 hours of verifiable Continuing Professional Development (CPD). Which one of the following is an acceptable form of verifiable CPD?
 - (a) Attendance at staff meeting
 - (b) Completion of appraisal
 - (c) Reading dental journals
 - (d) Reading dental textbooks
 - (e) Sitting an examination
8. One of your dental nurse colleagues has several years experience of working in a busy dental practice and has expressed an interest in taking on the role of dental nurse manager. This will involve the organisation and planning of the work practices of the dental nurses. Which one of the following GDC Standards is most likely to apply to this situation?
 - (a) Delegation
 - (b) Registration

- (c) Relationships
 - (d) Reporting
 - (e) Responsibility
9. If a dental nurse believes that another team member's actions may put a patient at risk, he or she has a duty to raise a concern. Which one of the following GDC Standard key principles does this relate to?
- (a) Be trustworthy
 - (b) Cooperate with other team members
 - (c) Protect patient confidentiality
 - (d) Put patients' interests first
 - (e) Respect patients' dignity and choices
10. When a dental nurse has raised a concern about a serious matter, he or she is protected from retaliation in some circumstances under the Public Interest Disclosure Act 1998. Which one of the following states a circumstance where this protection will not apply?
- (a) Acting in good faith
 - (b) Allegation involves a crime
 - (c) Believe the allegation to be true
 - (d) Will gain personally from the outcome
 - (e) Working outside the NHS
11. A compulsory aspect of registered dental nurses' professional work is to regularly update their knowledge. This is called Continuing Professional Development (CPD) and is either verifiable or non-verifiable. Which one of the following is not necessary for CPD to be verifiable?
- (a) Attendance at an event
 - (b) Certification
 - (c) Record of hours
 - (d) Record of participation
 - (e) Stated learning outcomes
12. A key aspect to the successful working of the dental team is for the majority of patients to be seen by a dentist for a full mouth assessment first, before possibly referring on to another team member. Which one of the following treatments can be provided without the input of a dentist first?
- (a) Cementing of a crown
 - (b) Extraction of a deciduous tooth
 - (c) Placement of a temporary filling
 - (d) Provision of full dentures
 - (e) Taking of a radiograph

13. It is sometimes appropriate to raise concerns about some issues at a local level, for example with an employer or the Primary Care Trust. However, some issues should be raised directly with the General Dental Council. Which one of the following is a matter that can be raised at a local level?
- (a) Alcoholism
 - (b) Dishonesty
 - (c) Drug taking
 - (d) Fraud
 - (e) Indecency
14. Under the 'Scope of Practice' document produced by the General Dental Council, dental nurses may be able to carry out additional duties under certain circumstances. Which one of the following indicates the most likely circumstance where additional duties would be acceptable?
- (a) During a short-staff period
 - (b) During an emergency
 - (c) Following competency training
 - (d) Instructed by employer
 - (e) Instructed by senior staff member
15. You have been asked by your dentist to give diet and oral hygiene advice to the mother of a 4-year-old child. Which one of the following GDC Standards would have to be complied with?
- (a) Delegation
 - (b) Relationships
 - (c) Registration
 - (d) Reporting
 - (e) Responsibility
16. From time to time, it may be necessary to release confidential information about a patient to a third party, without the patient's consent. Which one of the following organisations is the most likely source of advice on the legalities of this issue?
- (a) Care Quality Commission
 - (b) Defence organisation
 - (c) Department of Health
 - (d) General Dental Council
 - (e) Primary Care Trust
17. Patients are entitled to expect that the dental team will keep any information held about them confidential – this is called the duty of confidentiality. Which one of the following is the exception to this duty?
- (a) Information learned anonymously
 - (b) Information learned from a team member
 - (c) Information learned from another patient

- (d) Information learned outside professional role
 - (e) Information learned verbally
18. Whilst preparing the surgery for the afternoon treatment session, you find a purse from a previous patient under the dental chair. As the patient's mobile phone number is on her dental records, you contact her to let her know that you have found her purse. Which one of the following GDC Standards is most relevant to your actions?
- (a) Be trustworthy
 - (b) Cooperate with team members
 - (c) Maintain professional knowledge
 - (d) Protect confidentiality
 - (e) Respect patients' dignity and choices
19. From time to time, it may be necessary to share confidential information about patients without their consent, because it is in the public interest to do so. Which one of the following indicates when this circumstance does not apply and information should not be released?
- (a) After the patient's death
 - (b) Detection of a serious crime
 - (c) Prevention of a serious crime
 - (d) Under a court order
 - (e) Where the patient's health is at risk
20. Various post-registration qualifications available to dental nurses require the completion of portfolios and log books during the relevant training period. Which one of the following personal details can be included in these records without breaching the patient's confidentiality?
- (a) Address
 - (b) Date of birth
 - (c) Gender
 - (d) Patient first name
 - (e) Patient surname
21. When any member of the dental team is providing care for a patient, it is always advisable for a second GDC registered team member to also be present. Which one of the following is the most likely acceptable circumstance where this may not be possible?
- (a) During a sedation session
 - (b) Out-of-hours emergency
 - (c) When short staffed
 - (d) When treating adults
 - (e) When treating children

Answers

Multiple choice questions

1. *Correct answer: e.* The GDC document 'Standards for Dental Professionals', principle 2.3 states that dental professionals are responsible for making sure they 'do not discriminate against patients'. As the patient has admitted he is a dustman, the dentist has assumed that he is poorly paid and will not be interested in trying to save his tooth from extraction. The dentist has therefore discriminated against the patient on the grounds of socioeconomic background.
2. *Correct answer: e.* Dental nurses may go on to take post-registration training and qualification in these areas of their role, but they are not a compulsory 'core subjects' that must be covered over the CPD cycle.
3. *Correct answer: d.* The GDC Standards document states that dental professionals must 'put patients' interests first and act to protect them'. Under this guidance, dental professionals have a duty to report any issue or behaviour by themselves or a colleague that they believe may put patients at risk. In this case, failure to follow the workplace policy on infection control correctly may put patients at risk of cross-infection.
4. *Correct answer: e.* The GDC Standards document that provides guidance on the 'principles of raising concerns' clearly states that one of the organisations that will give independent advice on these types of issues is the authority Public Concern at Work. Their advice is confidential and free.
5. *Correct answer: b.* To remain registered with the GDC as a dental professional, all registrants are expected to undertake the required amount of Continuing Professional Development (CPD) set out for their registrant group. This covers 'core subjects' as a minimum over a 5-year cycle, but additional non-verifiable CPD should also be undertaken and recorded too. Reading dental journals covering relevant topics is included as non-verifiable CPD.
6. *Correct answer: c.* The GDC document 'Standards for Dental Professionals', principle 5 states that dental professionals must 'maintain your professional knowledge and competence'. Annual certification in Basic Life Support is a 'core subject' requirement of CPD too.
7. *Correct answer: e.* Verifiable CPD is that which can be proved to have been undertaken after the event. This can be achieved by keeping a record of the following information: aims and objectives of the event, and its learning outcomes, date, topic, and number of hours of verifiable CPD provided, a certificate of participation in the event, signed by the organiser of the event. Of the options listed, only sitting an examination will achieve all these points.
8. *Correct answer: a.* The art of delegation is a key aspect of any management role, where the manager has an overview of all the tasks that need to be carried

out on a daily basis in the workplace, and which member of staff is most experienced, qualified and capable of carrying out each one. This is an essential skill in leadership and working as a team, as laid out in the GDC document 'Standards for Dental Professionals', principle 4: 'co-operate with other members of the dental team and other healthcare colleagues in the interests of patients'.

9. *Correct answer: d.* This is covered under key principle 1 of the GDC document 'Standards for Dental Professionals': 'put patients' interests first and act to protect them'. All dental professionals have a duty of care to patients to raise concerns under these circumstances.
10. *Correct answer: d.* This is covered in GDC Standards under item 4 of the 'Principles of Raising Concerns', which gives advice on the protection available for people who raise concerns, under the Public Interest Disclosure Act 1998. This clearly states that anyone who raises a concern must not do so if they intend to make a personal gain by doing so. An example may be when an act of whistleblowing results in the sacking of one person, and the whistleblower intends to be promoted to the job vacancy created.
11. *Correct answer: a.* Many dentists and dental care professional undertake some of their verifiable CPD by reading journals and completing written assessments on the various topics covered. This can be done online and computer marked, or sent away to be marked by an organiser of the CPD. Certificates can then be issued when a set level of correct answers has been given by the participant, indicating that learning outcomes have been achieved. Attendance at a CPD event of this nature is therefore not required.
12. *Correct answer: d.* Clinical dental technicians who are registered with the GDC can provide full dentures to edentulous patients without any input or prescription from a dentist beforehand. All the other options listed can be provided by various dental care professionals, but only on the prescription of a dentist.
13. *Correct answer: a.* All the other options listed are either directly illegal or will result in criminal charges for the dental care professional concerned. Alcoholism will only become a serious matter if the affected person carries out a barred task while under the influence of alcohol, such as driving a motor vehicle or being under the influence of alcohol while carrying out their professional duties.
14. *Correct answer: c.* No matter what the additional duties are, dental nurses must have received adequate training that has been documented as having taken place, and signed and dated by both nurse and trainer. The document must indicate that the dental nurse has achieved a satisfactory level of competence in the topic. No matter what the circumstances, dental nurses

must never carry out tasks for which they have not been adequately trained and declared as competent.

15. *Correct answer: e.* As a member of the dental team, the dental nurse may be asked from time to time to carry out various duties, such as advising patients about oral hygiene. However, team members have a responsibility to ensure that they do not work outside the bounds of their own training and level of competence. Therefore, if the mother of the child asks a question beyond the knowledge of the team member at the oral hygiene advice session, the team member is responsible for referring it to a more qualified colleague.
16. *Correct answer: b.* To release confidential information about patients without their consent may be necessary for legal reasons rather than ethical ones. In this case, a legal opinion should be sought before doing so, and of the options listed in the question, a dental defence organisation is the most appropriate body that will be able and willing to give that legal advice.
17. *Correct answer: d.* The duty of confidentiality that all dental team members have to their patients applies to all information about any patient that has been learned by team members in their professional role. Theoretically, information learned outside the professional role is exempt from this duty. However, as professional healthcare workers in the eyes of the public, it would be advisable to maintain the patients' confidentiality under all circumstances.
18. *Correct answer: a.* The GDC document 'Standards for Dental Professionals', principle 6 states that all team members should 'justify the trust that your patients, the public and your colleagues have in you by always acting honestly and fairly'. Some persons in this situation may be tempted to keep the patient's wallet for themselves, but that is certainly not the action that should be taken by any dental team member who aspires to being seen as a professional in society.
19. *Correct answer: a.* Unless the second, third or fourth options listed apply to the situation, all dental team members must keep information about a patient confidential, even after the patient's death. This is stated in the GDC document 'Principles of Patient Confidentiality', point 1.4, under the section on 'Duty of confidentiality'. It is considered acceptable to share confidential information about a patient without consent if the patient's health is at risk, as well as if a serious crime is involved or if a court order has been issued requiring the release of confidential information.
20. *Correct answer: c.* Stating whether a patient is male or female, without releasing any further personal information, ensures that their identity remains protected. Any of the other options listed state personal information that could be used to reveal the identity of the patient, if the reader of the portfolio or log book is inclined to investigate the matter. For this reason, all patient records copied or referred to in these training documents must be anonymised,

by deleting any personal information about the patient in a manner that prevents that information from being retrieved.

21. *Correct answer: b.* This is the only scenario from the options listed where it is acceptable for a dental team member to be working alone. However, even under these circumstances, the dental team member is expected to take responsibility for assessing the possible risk to the patient of continuing with treatment in the absence of another team member. This is covered in the GDC document 'Principles of Dental Team Working' under item 3, which covers individual responsibilities within the team.

8

Legal and Ethical Issues

Multiple choice questions

1. From time to time a patient may require certain medications and the practice will issue a prescription. A prescription sheet will be valid and can be issued by the pharmacy if it has been signed by which one of the following persons?
 - (a) Dental hygienist
 - (b) Practice manager
 - (c) Qualified dental nurse
 - (d) Receptionist
 - (e) Vocational trainer
2. When patients attend the dental surgery for treatment, they must be given certain information by the dental team before they can decide if they wish to proceed with the treatment or not. This is termed valid consent. Which one of the following is not necessary for consent to be valid?
 - (a) Agreed in writing
 - (b) Detail all costs
 - (c) Give full information
 - (d) Given voluntarily
 - (e) Specific to the treatment
3. One of the responsibilities of the dental surgery is to undergo a 3-yearly assessment of radiation safety on the premises. This can be done using a specialist processing test kit which is sent off for analysis, or by undergoing an inspection on the premises. Which one of the following organisations is most likely to undertake this inspection?
 - (a) Health and Safety Executive
 - (b) Health Protection Agency
 - (c) Primary Care Trust
 - (d) Radiation Protection Adviser
 - (e) Radiation Protection Supervisor

4. A 27-year-old private patient attends the surgery with severe dental pain and requests the extraction of the lower left third molar tooth. Four months later, the left side of his tongue is still numb and he decides to make a formal complaint against the dentist. Which one of the following organisations should the patient contact?
 - (a) Care Quality Commission
 - (b) Department of Health
 - (c) General Dental Council
 - (d) Primary Care Trust
 - (e) Strategic Health Authority
5. Radiation monitoring badges are devices designed to protect staff from over-exposure to ionising radiation. Their use is not compulsory in the dental workplace, unless staff are exposed to an excess of which one of the following over a weekly period?
 - (a) 100 intra-oral exposures
 - (b) 15 extra-oral exposures
 - (c) 150 intra-oral exposures
 - (d) 30 extra-oral exposures
 - (e) 50 intra-oral exposures
6. One of your old high school friends attends the surgery for extraction of the upper left second molar tooth. You know her to be an intravenous drug user, but notice that she has not declared this on her medical history form. Which one of the following actions should you take?
 - (a) Ask your dentist to double glove
 - (b) Ask your dentist to prescribe antibiotics
 - (c) Tell her to go to another dentist
 - (d) Tell your dentist that she may harbour blood-borne viruses
 - (e) Treat her as any other patient
7. While working on reception at your dental surgery, the husband of a patient telephones and asks you for information about the treatment procedure his wife had carried out yesterday. You explain to the husband that you are unable to disclose this information as it is a breach of confidentiality. Which one of the following is the legislation that relates to patient confidentiality?
 - (a) Access to Health Records
 - (b) Caldicott Regulations
 - (c) Dentists Act 1984
 - (d) Department of Health guidance
 - (e) General Dental Council Standards guidance
8. In certain circumstances, it is acceptable for the dental surgery to release personal details to a third party without the patient's written permission. To which one of the following persons can details be given?
 - (a) Bailiff
 - (b) Employer

- (c) Headmaster
 - (d) Husband or wife
 - (e) Tax inspector
9. When using radiography techniques in the dental surgery, it is important that the dental team have a Quality Assurance system in place. The use of this system has to achieve all except which one of the following options?
- (a) Ease of use
 - (b) Identify processing faults
 - (c) Identify solutions to problems
 - (d) Keep costs to a minimum
 - (e) Limit exposure
10. An associate dentist is completing an NHS claim form for a patient who is exempt from charges and you have noticed that he regularly claims for treatment that has not been carried out. You have reported this matter to your principal dentist. Which one of the following gives you protection from possible retaliation in this matter?
- (a) Caldicott Regulations
 - (b) Data Protection Act (1998)
 - (c) Freedom of Information Act
 - (d) General Dental Council
 - (e) Public Interest Disclosure Act (1998)
11. Patient records are legal documents that provide a wealth of information about patient attendance, treatment, personal details, and attitudes to oral healthcare. When a child patient leaves the dental surgery, it would be ideal for the records to be kept forever. However, legally they only need to be kept until the patient is what age?
- (a) 16 years old
 - (b) 18 years old
 - (c) 21 years old
 - (d) 25 years old
 - (e) 30 years old
12. The dentist has taken a diagnostic periapical radiograph of an upper right central incisor during root canal treatment. After processing, the image appears elongated and the apex of the root is not visible on the film. Which one of the following would correctly score the quality assurance rating of this radiograph?
- (a) Score 0
 - (b) Score 1
 - (c) Score 2
 - (d) Score 3
 - (e) Score 4

13. Recently, money has been found to be missing from the cash box at your dental surgery and this has put everyone under suspicion. Yesterday lunchtime you observed the locum dentist taking money from the box and placing it in his wallet, and you have now reported this to your employer. Which one of the following gives you protection from possible retaliation in this matter?
- (a) Caldicott Regulations
 - (b) Data Protection Act (1998)
 - (c) Freedom of Information Act
 - (d) General Dental Council
 - (e) Public Interest Disclosure Act (1998)
14. From time to time, patients may feel that they have received a less than adequate service from their dental surgery and make a complaint. In order to handle the complaint correctly, the dental team must carry out which one of the following?
- (a) Accept liability
 - (b) Acknowledge receipt within the week
 - (c) Apologise unreservedly
 - (d) Provide details of the staff member involved
 - (e) Report back to the patient within 10 days
15. To ensure the safety of all staff and patient escorts, a designated controlled area is set up at each X-ray machine. This is an area which must admit no one except the patient during the exposure time. Which one of the following is the point from which this distance is measured?
- (a) Dental chair
 - (b) Machine control panel
 - (c) Machine head
 - (d) Surgery door
 - (e) X-ray film packet
16. You have recently started a new job as a trainee dental nurse in a local surgery. As part of your induction training, the dentist provides you with information about the responsibilities and standards that the dental team have to comply with. Which one of the following documents is the information that you were provided with?
- (a) Access to Health Records
 - (b) Caldicott Regulations
 - (c) Dentists Act 1984
 - (d) Department of Health guidance
 - (e) General Dental Council Standards guidance
17. Whilst working on the reception desk you overhear the receptionist talking to a patient on the telephone. The receptionist becomes frustrated and puts the telephone down, then tells you that she could not understand the patient as

he didn't speak English very well. Which one of the following types of discrimination has the receptionist shown?

- (a) Age discrimination
- (b) Ethnic discrimination
- (c) Religious discrimination
- (d) Sex discrimination
- (e) Socioeconomic discrimination

18. Under the IR(ME)R regulations, every effort must be made to follow the principle of ALARP (ALARA) when exposing patients to ionising radiation. Which one of the following will not achieve ALARP (ALARA)?

- (a) Expose patient only
- (b) Fresh processing solutions
- (c) Maintain equipment
- (d) Quality assurance programme
- (e) Use of D speed films

19. The dentist has taken a left bitewing radiograph to determine if an interproximal cavity is present on the lower left first molar tooth. After processing, it is clear that coning has occurred during exposure of the film, and the lower left second and third molar teeth are missing from the image. Which one of the following would correctly score the quality assurance rating of this radiograph?

- (a) Score 0
- (b) Score 1
- (c) Score 2
- (d) Score 3
- (e) Score 4

20. An important part of the day-to-day duties of all dental team members is to record the personal and clinical details of all patients, and their treatment sessions. These records should always be contemporaneous. Which one of the following indicates the correct meaning of this term?

- (a) Accurate
- (b) Date ordered
- (c) Legible
- (d) Signed off
- (e) Using correct terminology

21. Throughout their dental career, all dental personnel are required to act in the best interests of the patient. Unfortunately, a small minority of dental team members fail to follow this requirement at all times. Before statutory registration of DCPs began, only the dentist would have been held responsible for these failures. Which one of the following terms best describes this fact?

- (a) Breach of confidentiality

- (b) Indemnity
 - (c) Omission
 - (d) Valid consent
 - (e) Vicarious liability
22. The aim of a quality assurance programme of radiographs is to ensure that any faults of exposure or processing are identified, solved and kept to a minimum at all times. Which one of the following is the most likely ratio of acceptable ratings for processed films?
- (a) Score 1, 10% maximum
 - (b) Score 1, 10% minimum
 - (c) Score 1, 70% maximum
 - (d) Score 3, 10% maximum
 - (e) Score 3, 70% minimum
23. Various items of legislation are in place to ensure the safe use of radiation in the dental workplace. Every dental surgery has to ensure that all staff comply fully with this legislation, and must have an appointed person to do so. Which one of the following is the title of this appointment?
- (a) Health and Safety Executive
 - (b) Health Protection Agency
 - (c) Legal Person
 - (d) Radiation Protection Advisor
 - (e) Radiation Protection Supervisor
24. Patient records are legal documents that provide a wealth of information about patient attendance, treatment, personal details, and attitudes to oral healthcare. When an adult patient leaves the dental surgery, it would be ideal for the records to be kept forever. However, legally they only need to be kept for what length of time?
- (a) 5 years
 - (b) 7 years
 - (c) 9 years
 - (d) 11 years
 - (e) 13 years
25. As part of the regulations governing the use of ionising radiation in the dental workplace, written information about the controlled area must be kept on display at each X-ray machine. Which one of the following describes the title of this written information?
- (a) IR(ME)R
 - (b) IRR 99
 - (c) Local Rules
 - (d) Quality assurance programme
 - (e) Radiation Protection file

26. The dentist has taken a periapical radiograph of an upper left second premolar tooth that has been fractured and requires extraction. After processing, the radiograph appears black and the image of the tooth cannot be seen. Which one of the following would correctly score the quality assurance rating of this radiograph?
- (a) Score 0
 - (b) Score 1
 - (c) Score 2
 - (d) Score 3
 - (e) Score 4
27. Patients have the right of access to their own health records, if written after 1991. In order to comply with this right, the patient and the dental surgery personnel must abide by which one of the following options?
- (a) Access approved by record holder
 - (b) Give written receipt
 - (c) Release to family member
 - (d) Respond to request within 10 days
 - (e) Verbal request for access
28. The dental terminology used to describe diagnostic items once they have been exposed and processed is quite distinct. Which one of the following describes an item that is mounted on a viewer following processing?
- (a) Film
 - (b) Film packet
 - (c) Radiograph
 - (d) X-ray
 - (e) X-ray film
29. A 40-year-old patient attends the surgery to complete the current course of treatment. He has a porcelain veneer fitted to the upper left lateral incisor, and a general scale and polish of all standing teeth. Which one of the following types of paperwork will the patient be given?
- (a) Consent form
 - (b) Estimate
 - (c) Medical history form
 - (d) Receipt
 - (e) Record card
30. Within every dental workplace using ionising radiation techniques, a designated person must be appointed to assess risk and oversee precautions to minimise the risks identified. Which one of the following is the title for this designated person?
- (a) Legal Person
 - (b) Medical physicist

- (c) Quality Assurance Manager
- (d) Radiation Protection Advisor
- (e) Radiation Protection Supervisor

31. Under the GDC 'Scope of Practice' document, the dental nurse may carry out additional duties after receiving suitable training for them. This training is often given on the dental premises and by a work colleague, with written records kept as evidence of the training received. Which one of the following tasks requires both assessment and qualification before the dental nurse can carry it out?
- (a) Assist in special waste disposal
 - (b) Change processing solutions
 - (c) Expose films
 - (d) Process films
 - (e) Run a quality assurance programme
32. When an X-ray machine is in use, the beam of ionising radiation can travel through the patient and scatter into the surrounding area. Although all persons except the patient should be outside the controlled area, which one of the following additional precautions should be taken to restrict the area of the X-ray beam?
- (a) Collimator
 - (b) Fast film
 - (c) Intensifying screen
 - (d) Lead apron
 - (e) Lead walls

Extended matching questions

Legislation and regulation

For each of the legislation or regulation questions, select the single most appropriate Act or regulation from the option list. Each option might be used once, more than once, or not at all.

- (a) Access to Health Records
- (b) Amendment Order 2005
- (c) Caldicott Regulations
- (d) Data Protection Act
- (e) Developing the Dental Team
- (f) Freedom of Information Act
- (g) IR(ME)R
- (h) IRR 99
- (i) Public Interest Disclosure Act

- (j) Scope of Practice
- (k) The First Five Years

1. The General Dental Council is the regulatory body for dentists and all dental care professionals working in the UK. It regularly produces documentation that offers guidance and advice on numerous issues that affect the dental team. Which one of the options listed is the publication concerned with giving guidance on the level of competence expected of a newly qualified dental nurse?
2. All dental workplaces use ionising radiation as a useful diagnostic tool: to assess patients, to identify dental diseases and problems, and to plan treatments that will solve the problems that have been diagnosed. The safe use of ionising radiation on the premises is subject to various legislation and regulation in order to ensure the safety of all patients and the dental team. Which one of the options listed is the legislation specifically concerned with the protection of staff on the premises?
3. Under certain circumstances, a member of the dental team may become aware of an act or omission by another dental care professional that could jeopardise the safety of patients. The member has a duty of care to the patient and should report the matter accordingly. Which one of the options listed is legislation that protects the member from retaliatory action by the employer in these circumstances?
4. Sometimes, the professional relationship between a dentist and a patient is irreversibly damaged, often due to poor communication between the two parties. The patient may choose to leave the current practice and seek treatment elsewhere. Which one of the options listed is legislation that allows patients to receive copies of their dental records?
5. The General Dental Council is the regulatory body for dentists and all dental care professionals working in the UK. It regularly produces documentation that offers guidance and advice on numerous issues that affect the dental team. Which one of the options listed is the publication concerned with giving guidance on the level of competence expected of a newly qualified dentist?
6. All dental workplaces use ionising radiation as a useful diagnostic tool: to assess patients, to identify dental diseases and problems, and to plan treatments that will solve the problems that have been diagnosed. The safe use of ionising radiation on the premises is subject to various legislation and regulation in order to ensure the safety of all patients and the dental team. Which one of the options listed is the legislation specifically concerned with the protection of patients?

Answers

Multiple choice questions

1. *Correct answer: e.* Only a qualified dentist can issue an NHS or private prescription, and a vocational trainer must also be a qualified dentist. None of the other options listed are personnel able to sign a prescription.
2. *Correct answer: a.* While it is considered best practice for all treatment courses to be agreed in writing, it is not necessary in every case and is therefore not a requirement for consent to be valid. Ideally, all extensive, complicated and expensive courses of treatment should be covered by a written agreement, as should any course involving sedation techniques. In all cases, the patient must be issued with a written and itemised estimate of the proposed treatment plan.
3. *Correct answer: b.* The Radiation Protection Division of the Health Protection Agency has replaced the original organisation that advised the Department of Health in relation to the safe use of radiation in the dental practice. The original organisation was the National Radiological Protection Board, and part of its involvement in the regulations and legislation was to carry out inspection of the dental premises, or analyse their submitted processing test kits, on a 3-yearly assessment basis.
4. *Correct answer: c.* The Department of Health, Primary Care Trust and Strategic Health Authority are bodies involved in NHS medical and dental treatment only. However, as the dental regulatory body, the General Dental Council is tasked with protecting all patients and regulating all members of the dental team, whether working in the NHS or the private sector. The Care Quality Commission has recently been appointed to ensure that dental premises and work practices are safe for use by patients.
5. *Correct answer: c.* Any dental premises where more than 150 intra-oral exposures or 50 extra-oral exposures are taken over a weekly period must ensure that their staff are fully protected from the effects of ionising radiation, by providing them with personal monitoring badges. Where these numbers of exposures are involved, the use of monitoring badges is a legal requirement.
6. *Correct answer: e.* Any patient attending the dental workplace may have a serious medical condition, including a life-threatening infectious condition, that could be passed on to staff or other patients. The patient may be unaware of the condition or may fail to disclose it to the dental team. The only safe option when treating patients is for everyone to be considered a potential source of infection, and for the workplace to have robust infection control standards in place that will prevent cross-infection. Under these circumstances then, all patients should be treated in the same manner.

7. *Correct answer: b.* The Caldicott Report and the regulations that followed from its publication are concerned with issues of confidentiality of patients' medical (and dental) records. While it is accepted that communication between members of the dental profession is necessary when relating to a mutual patient, the information released should be on a 'need-to-know' basis, to protect and respect the patient's right to confidentiality. While the GDC Standards Guidance publication touches on the principles of patient confidentiality, the Caldicott regulations deal exclusively with the issue.
8. *Correct answer: a.* In cases of the non-payment of dental charges by a patient, the dental surgery may appoint a debt collection agency to act on its behalf to recover the debt. In these circumstances, a bailiff is an official with the legal authority to serve writs and seize assets on behalf of the dental surgery, and to do so will require the personal details of the patient involved and can receive them without the patient's permission.
9. *Correct answer: d.* Dental workplaces are legally obliged to run a quality assurance system, in line with current ionising radiation regulations and clinical governance requirements. Their purpose with regard to the use of X-rays is to identify faults and their solutions, in an effort to limit the exposure of both staff and patients to ionising radiation. To achieve these aims, the system must be uncomplicated and straightforward so that it can be used with ease by all trained personnel. While a reduction in unnecessary repeat exposures will indeed keep costs down, it is not necessary for the quality assurance system to function adequately.
10. *Correct answer: e.* In this instance, the associate dentist is acting in a dishonest, potentially illegal manner by making fraudulent claims for payment from the NHS. Under these circumstances, an employee who raises a genuine concern about the issue will be acting in the public interest by reporting the matter, and will be protected from any possible retaliation by the Public Interest Disclosure Act.
11. *Correct answer: d.* Children reach the age of majority or adulthood at the age of 18 years, although some individuals are deemed to be capable of making decisions about their dental treatment, and giving consent for it, at a younger age. Once they have left a dental practice as a patient, irrespective of their actual age or level of maturity, their records need only be retained until they reach the age of 25 years.
12. *Correct answer: d.* The quality assurance rating set out in clinical governance guidelines runs from 1 to 3. Score 1 indicates 'excellent quality', score 2 indicates 'diagnostically acceptable with minimal errors' and score 3 indicates 'unacceptable quality of no diagnostic value'. As the full length of the root cannot be seen in this case, it must be a score 3.
13. *Correct answer: e.* In this instance, the locum dentist is committing theft against the principal dentist, which would be considered gross misconduct

and a serious crime by any standards. Under these circumstances, an employee who raises a genuine concern about the issue will be acting in the public interest by reporting the matter, and will be protected from any possible retaliation by the Public Interest Disclosure Act.

14. *Correct answer: e.* When a patient makes a complaint, the practice must have a set procedure in place to deal with it sensitively – it cannot be ignored. Receipt of the complaint must be given within two working days, but details of the staff member involved must not be released. Until the investigation is complete, liability should not be accepted by the practice, nor should an unreserved apology be given. However, a written investigation report should be sent to the patient within 10 working days of receipt of the complaint.
15. *Correct answer: c.* The X-ray machine head contains the ionising radiation source and is the point from which the X-ray beam is generated during exposure. It is from this point that everyone except the patient must be a clear distance of at least 2 metres away.
16. *Correct answer: e.* All staff working within the dental workplace, including those yet to become GDC registrants, must be aware of and abide by the principles laid down in the GDC Standards Guidance document. Although not registered with the GDC at this point in their career, trainee dental nurses must still be aware of the limits to their roles and level of competence within their day-to-day duties, and must not overstep them. They also need to be aware of what their employer can and cannot reasonably expect them to do while carrying out those duties, and where to seek help and advice when necessary.
17. *Correct answer: b.* A person's ethnicity is determined by factors such as race, culture or language common to all members of a group. To treat someone unfavourably because of a language difference is therefore to discriminate on the grounds of ethnic origin.
18. *Correct answer: e.* The faster the speed of the film used, the lower the X-ray exposure to the patient. D speed films have long been superseded by the faster E speed films, so the use of D speed does not achieve ALARP (as low as reasonably practicable/possible). All the other options listed will achieve ALARP.
19. *Correct answer: c.* The quality assurance rating set out in clinical governance guidelines runs from 1 to 3. Score 1 indicates 'excellent quality', score 2 indicates 'diagnostically acceptable with minimal errors' and score 3 indicates 'unacceptable quality of no diagnostic value'. As the tooth to be viewed is the lower left first molar, a diagnosis can still be made from the image produced, but the radiograph is not perfect. It therefore scores a quality assurance rating of 2.
20. *Correct answer: b.* Each entry in a patient's dental records, whether computerised or hand written, must be created at that time or very shortly

afterwards, before any other entries are made. The records will then show a date-ordered sequence of attendance, treatment, discussion, etc. that cannot be altered after the fact. In this way, omissions cannot be added at a later date, so failure to record something at the time which later gives grounds for complaint by the patient cannot be added surreptitiously to give the impression that the dental team are innocent of the complaint. Likewise, the patient cannot claim not to have been made aware of something that has been clearly recorded in the contemporaneous records either.

21. *Correct answer: e.* This was the term used to describe the employing dentist's sole responsibility for the actions or omissions of all staff, before statutory registration of all dental care professionals began. Although the employer is still responsible for ensuring that all staff are trained in the correct workplace protocols and procedures so that mistakes do not happen, the staff now also have a responsibility to act in accordance with the principles laid down in the GDC document 'Standards for Dental Professionals'. Failure to do so by choice now renders the staff member liable.
22. *Correct answer: d.* Score 3 indicates an unacceptable quality of image with no diagnostic value, and its occurrence should be kept to an absolute minimum. The accepted level of score 3 is set at 10% of all exposures as a maximum level, so no more than 10% of films should be rated as unacceptable with no diagnostic value. Score 1, indicating excellent quality, should be at a minimum of 70% of all exposures.
23. *Correct answer: c.* The Legal Person is usually the senior dentist in the workplace, although it can alternatively be a suitably qualified and trained member of staff. It is their duty to ensure that all team members comply fully with all the ionising radiation legislation and regulations covered by IRR 99 and IR(ME)R.
24. *Correct answer: d.* For adult patients, all records are required to be kept for a minimum of 11 years after the end date of the last course of treatment provided at the dental surgery. If the patient re-attends during this time, the date extends to 11 years after the end date of the subsequent treatment course.
25. *Correct answer: c.* The Local Rules are specific for each X-ray machine with regard to some of the information that must be shown, such as details of the controlled area and correct working instructions. Other information that must be displayed will be common to all machines on the premises, such as details of the designated Radiation Protection Supervisor (RPS) and Radiation Protection Advisor (RPA), and the presence of controlled area warning signs. All the other options listed are generic details for the whole workplace, rather than specific (local) details for each machine.
26. *Correct answer: d.* The quality assurance rating set out in clinical governance guidelines runs from 1 to 3. Score 1 indicates 'excellent quality', score 2 indicates

‘diagnostically acceptable with minimal errors’ and score 3 indicates ‘unacceptable quality of no diagnostic value’. As the image of the tooth cannot be seen in this case, the quality assurance rating must be score 3.

27. *Correct answer: a.* Only the record holder can approve access, and this will usually be the dentist. No other member of staff can agree to patients’ right of access to their dental records on behalf of the dentist or in the dentist’s absence. The records can only be released to patients themselves after a written request for access has been made, and the record holder has up to 40 days to respond to the request. The record holder would not issue a receipt, as the records are being provided not received.
28. *Correct answer: c.* The film, or X-ray film, is the chemically coated, unexposed piece of celluloid that is enclosed within the plastic film packet. The X-ray is the beam of ionising radiation that is fired at the film, within the film packet, during the exposure procedure. During processing of the exposed film, the image is developed and then fixed onto the celluloid to produce the radiograph.
29. *Correct answer: d.* As the patient is completing his course of dental treatment, he should already have been issued with an estimate and a consent form previously. The medical history form will have been issued, completed by the patient, and returned to the records before treatment started. The record card remains the property of the treating dentist, but a receipt must be issued after each completed stage of treatment to show that the various items have been paid for by the patient. In this scenario, none of the other options listed will have been issued at treatment completion.
30. *Correct answer: e.* The Radiation Protection Supervisor (RPS) is the designated person within the dental workplace with the requisite knowledge to assess the risks associated with the use of ionising radiation and to implement the precautions required to minimise those risks. The person can be any staff member with the necessary dental radiography knowledge and qualification, so it may be a dentist, dental therapist, or a radiography qualified dental nurse.
31. *Correct answer: c.* Only dental nurses who have attended an appropriate dental radiography training course, and been successful in the associated examination for that subject, can expose a patient to ionising radiation legally. Any of the other options listed can be carried out by any member of staff, once they have received the suitable training required.
32. *Correct answer: a.* The collimator is the rectangular-shaped tube that extends from the X-ray machine head and is used to aim the X-ray beam so that it strikes the film perpendicularly (unless a bisecting angle technique is being used). Its inner surface is lead lined so that any X-ray particles not travelling parallel to each other along the tube are prevented from scattering into the surrounding area. None of the other options listed are capable of restricting the actual area of the X-ray beam.

Extended matching questions

Legislation and regulation

1. *Correct answer: e.* This document lists the areas of dental nursing and its underpinning knowledge that a newly qualified dental nurse should be competent in, at qualification. It specifies which areas of the curriculum the nurse should 'have knowledge of', 'be aware of' or 'have understanding of', in an effort to give guidance on the level of competence that should be achieved.
2. *Correct answer: h.* IRR 99 is the ionising radiation legislation specific to staff protection, and involves regulations regarding the formal appointment of a Radiation Protection Advisor, as well as the designation of a Legal Person and a Radiation Protection Supervisor.
3. *Correct answer: i.* When a member of staff has whistleblown for all the right reasons (not for personal gain for instance) in an effort to protect the patient, the Public Interest Disclosure Act will prevent the employer (including NHS Trusts) from retaliatory action. Before the time of this Act, employees who reported serious issues to the authorities had little protection from being sacked by their employer.
4. *Correct answer: a.* All patients have access to their own health records that have been compiled since 1991, when the Act first came into effect. A set procedure must be followed by both the patient and the record holder (the dentist) to transfer the records correctly.
5. *Correct answer: k.* This is the newly qualified dentist's equivalent of the similar documentation for dental nurses (i.e. Developing the Dental Team). Dental schools are charged with ensuring that their undergraduate dentist programmes comply with the competency requirements of The First Five Years publication, so called as that was the length of dental training programmes at the time.
6. *Correct answer: g.* This legislation has several regulations in place to protect patients from over-exposure to ionising radiation while on the dental premises. They particularly focus around the principles of achieving ALARP.



Domain 3: Communication

9

Oral Health Instruction

Multiple choice questions

1. A 42-year-old patient attends the surgery for a routine dental examination and asks for advice on toothpastes that help to remove staining without damaging the enamel. The dentist is most likely to recommend toothpaste containing which one of the following ingredients?
 - (a) Biological enzymes
 - (b) Sodium fluoride
 - (c) Sodium monofluorophosphate
 - (d) Stannous fluoride
 - (e) Triclosan
2. Many of the risk factors associated with dental disease are also linked to the general health of the patient and are risk factors for various general diseases. Which one of the following conditions is associated with poor wound healing and periodontal disease?
 - (a) Alcoholism
 - (b) Diabetes
 - (c) Eating disorder
 - (d) Heart disease
 - (e) Obesity
3. Manual toothbrushing is carried out in an effort to remove as much bacterial plaque as possible in order to reduce the incidence of caries and periodontal disease. Which one of the following areas in the oral cavity is least effectively cleaned by manual toothbrushing?
 - (a) Gingival crevice
 - (b) Interdental areas
 - (c) Lingual tooth surface
 - (d) Occlusal fissures
 - (e) Tongue

4. A 19-year-old patient attends the surgery complaining of painful gingivae and halitosis. The dentist diagnoses acute necrotising ulcerative gingivitis, an infection linked to the anaerobic organism *Bacillus fusiformis*. Which one of the following mouthwash constituents is the dentist most likely to recommend?
 - (a) Biological enzymes
 - (b) Hydrogen peroxide
 - (c) Sodium fluoride
 - (d) Stannous fluoride
 - (e) Triclosan
5. Fluoride is an important component of toothpastes recommended to patients to reduce the occurrence of caries, as it helps to strengthen enamel against acid attack. Which one of the following is an additional beneficial effect of fluoride that helps reduce the incidence of caries?
 - (a) Antibacterial
 - (b) Breaks down food debris
 - (c) Inhibits bacterial feeding rate
 - (d) Neutralises toxins
 - (e) Reduces the pH level
6. Good communication skills are very important in ensuring that patients are fully informed, relaxed in the dental environment, and willing to proceed with proposed treatment. Which one of the following would you use to indicate that the patient has your attention?
 - (a) Folding the arms
 - (b) Frowning at them
 - (c) Making eye contact
 - (d) Smiling at them
 - (e) Standing
7. Bacterial plaque has been linked to the development of both dental caries and the onset of periodontal disease. Which one of the following describes the role of plaque in caries formation rather than periodontal disease?
 - (a) Acid formation
 - (b) Poor oral hygiene
 - (c) Presence of bacteria
 - (d) Presence of food debris
 - (e) Presence of saliva
8. Many patients use artificial sweeteners in tea and coffee to make them more palatable, with the added advantage of reducing the risk of developing dental caries. Which one of the following sweeteners is not derived from a natural sugar?
 - (a) Glycerol
 - (b) Mannitol

- (c) Saccharin
 - (d) Sorbitol
 - (e) Xylitol
9. A teenage girl has completed a diet sheet after two cavities were discovered at her routine examination. Which one of the following has been identified as a source of non-milk extrinsic sugar in her diet?
- (a) Apple juice
 - (b) Plain yoghurt
 - (c) Potatoes
 - (d) Strawberries
 - (e) Sweetcorn
10. A mother attends to seek advice on the necessity of fluoride drops for her young child. The dentist advises that it is not required because the region has a fluoridated water supply. Which one of the following indicates the likely concentration of fluoride added to the water supply?
- (a) 0.01 ppm
 - (b) 0.1 ppm
 - (c) 1 ppm
 - (d) 10 ppm
 - (e) 100 ppm
11. While giving oral health dietary advice, the clinician is likely to recommend that a patient avoids excessive consumption of which one of the following to reduce the occurrence of enamel demineralisation?
- (a) Ascorbic acid
 - (b) Citric acid
 - (c) Lactic acid
 - (d) Phosphoric acid
 - (e) Sulphuric acid
12. When delivering dental health advice to a patient, the dental team needs to be aware of various issues that may affect the motivation or ability of the patient to follow the advice. Which one of the following is most likely to affect the ability of the patient to carry out adequate plaque control?
- (a) Age
 - (b) Learning disability
 - (c) Medication
 - (d) Physical disability
 - (e) Socioeconomic status
13. Many of the risk factors associated with dental disease are also linked to the general health of the patient and are risk factors for various general diseases.

Which one of the following risk factors is associated with enamel erosion and general poor health?

- (a) Alcoholism
 - (b) Diabetes
 - (c) Eating disorder
 - (d) Obesity
 - (e) Smoking
14. Public health surveys throughout the country have consistently shown the benefit to oral health of the use of systemic fluoride. This has been achieved by comparing DMF counts in various populations. Which one of the following is the meaning of DMF?
- (a) Decayed, missing, filled
 - (b) Decayed, missed, fluoridated
 - (c) Decayed, missing, found
 - (d) Diseased, missing, filled
 - (e) Diseased, missed, fluoridated
15. Regular toothbrushing and the use of toothpastes is the most common method of removing bacterial plaque in order to reduce the risk of both caries and periodontal disease. Which one of the following toothpaste ingredients has the most effect on reducing the development of caries?
- (a) Biological enzymes
 - (b) Hydrated silica
 - (c) Sodium fluoride
 - (d) Sodium saccharin
 - (e) Triclosan
16. Many of the risk factors associated with dental disease are also linked to the general health of the patient and are risk factors for various general diseases. Which one of the following risk factors is associated with caries and obesity?
- (a) Alcoholism
 - (b) Diabetes
 - (c) Eating disorder
 - (d) High-sugar diet
 - (e) Smoking
17. Various oral health products are designed specifically to clean the interproximal areas of the dentition. Which one of the following products leaves some plaque behind when used in these regions?
- (a) Floss
 - (b) Interdental brush
 - (c) Interspace brush
 - (d) Tape
 - (e) Wood sticks

18. It is not always possible for patients to brush their teeth after every meal, especially when away from home at lunchtime. The dental team will then advise the use of a detergent food to help remove loose food debris at the end of the meal. Which one of the following foods should be recommended to patients?
 - (a) Carrot
 - (b) Crackers
 - (c) Grapes
 - (d) Peach
 - (e) Yoghurt
19. Good communication skills are of great importance in encouraging patients to take an active role in managing their own oral health. Which one of the following indicates a dismissive attitude towards the patient?
 - (a) Butting in verbally
 - (b) Folding the arms
 - (c) Rolling the eyes
 - (d) Sitting down
 - (e) Turning away
20. When various members of the dental team are required to communicate with patients, it is important that they all give the same message so that the patient does not become confused. Which one of the following is the most likely method used to achieve this?
 - (a) Check on the internet
 - (b) Copy what the dentist says
 - (c) Have a written protocol
 - (d) Learn the message by rote
 - (e) Refer to a textbook
21. Several risk factors have been attributed to the onset of periodontal disease or to worsening severity of the condition when it is present. Which one of the following oral health recommendations is irrelevant to a smoker with periodontal disease?
 - (a) Advice on flossing
 - (b) Dietary advice
 - (c) Oral cancer information
 - (d) Smoking cessation information
 - (e) Toothbrushing techniques
22. Patients are often given verbal oral health advice by a member of the dental team, often at the end of an appointment. Which one of the following is the preferred method of reinforcing that advice, so that the patient remembers it?
 - (a) Ask a colleague to reiterate it
 - (b) Ask the dentist to reiterate it
 - (c) Give in written form

- (d) Repeat it verbally at the next appointment
 - (e) Repeat it verbally at the time
23. The application of topical fluoride by members of the dental team is a recognised method of caries prevention. Which one of the following areas of the tooth benefits from this technique?
- (a) Buccal pits
 - (b) Gingival margin
 - (c) Interproximal areas
 - (d) Occlusal fissures
 - (e) Palatal surfaces
24. The technique of artificially fluoridating the general water supply is the most common method of providing systemic fluoride to the general population. Which one of the following indicates the reduction in caries incidence that this technique has been shown to achieve?
- (a) Up to 10%
 - (b) Up to 20%
 - (c) Up to 30%
 - (d) Up to 40%
 - (e) Up to 50%
25. Many of the risk factors associated with dental disease are also linked to the general health of the patient and are risk factors for various general diseases. Which one of the following risk factors is associated with oral cancer and chronic obstructive airways disease?
- (a) Alcoholism
 - (b) Heart disease
 - (c) High-sugar diet
 - (d) Obesity
 - (e) Smoking
26. Dental health education can be generalised into five key messages that will apply to the majority of the population. Which one of the following key messages applies to the smallest number of patients?
- (a) Do not smoke
 - (b) Reduce frequency of sugar consumption
 - (c) Regular dental examination
 - (d) Twice daily plaque removal
 - (e) Use of fluoride toothpaste
27. When delivering dental health advice to a patient, the dental team need to be aware of various issues that may affect the motivation or ability of the patient to follow the advice. Which one of the following is most likely to affect the ability of the patient to follow a healthy diet?

- (a) Age
 - (b) Learning disability
 - (c) Medication
 - (d) Physical disability
 - (e) Socioeconomic status
28. Good communication skills are of great importance in encouraging patients to take an active role in managing their own oral health. Which one of the following indicates that you are interested in what the patient is saying?
- (a) Breaking eye contact
 - (b) Folding the arms
 - (c) Leaning towards them
 - (d) Reapplying your PPE
 - (e) Standing up

Extended matching questions

Oral health advice and procedures

For each of the following oral health scenarios, select the single most appropriate advice or instruction from the option list. Each option might be used once, more than once, or not all.

- (a) Advice on toothbrushing
 - (b) Apicectomy
 - (c) Completion of a diet sheet
 - (d) Disclosing tablet use
 - (e) Flossing instruction
 - (f) Fluoride tablet use
 - (g) Fluoride toothpaste use
 - (h) Gingivectomy
 - (i) Prophylaxis polishing
 - (j) Reduce acid intake
 - (k) Reduce sugar intake
 - (l) Subgingival scaling
 - (m) Supragingival scaling
 - (n) Tooth restoration with amalgam filling
 - (o) Tooth restoration with crown
1. A 23-year-old female office assistant attends the practice with a chipped tooth, which happened the previous evening in a local bar. She complains of general tooth sensitivity to cold foods and drinks for the past few months, and is concerned that her teeth are 'crumbling' despite her low sugar diet. On examination, the dentist discovers a minimal incisal edge chip of the lower left central incisor that requires smoothing only. There are no cavities and the teeth

have clean shiny enamel generally. Which one of the options listed is the most likely advice given to this patient?

2. A 50-year-old male sales representative attends the practice for a routine dental examination. He complains of general swelling of his gums since reducing his alcohol intake and starting medication for hypertension prescribed by his doctor. On examination, the dentist notices gingival hyperplasia in the absence of plaque and calculus, and notes that the patient has previously had a good standard of oral hygiene too. Which one of the options listed is the procedure most likely to be recommended for this patient?
3. An 8-year-old girl attends the practice with her mother for a routine dental examination. Her mother complains that the daughter has halitosis, despite brushing her teeth daily, both morning and night. On examination, the dentist records the mixed dentition of the child and the presence of plaque in several areas. Which one of the options listed is the procedure most likely to be recommended for this patient?
4. A 70-year-old retired widower attends the practice with a worsening toothache of 4 weeks' duration. He complains of an initial twinge on the right when eating sweet foods only, but now has pain when chewing all foods in this area. On examination, the dentist discovers food trapped in the fractured lower right second molar. Which one of the options listed is the most likely procedure to be recommended for this patient?
5. A 35-year-old male attends the practice with a painless sinus associated with the upper right central incisor, which has been present intermittently for several months. He complains of an occasional bad taste and tenderness over the tooth. On examination, the dentist notes the tooth has a firm and well-fitting crown present, and a radiograph shows the presence of a post in the root filled tooth. Which one of the options listed is the procedure most likely to be recommended for this patient?
6. A 17-year-old patient attends the practice with several visible shadows in the upper anterior teeth. Examination and transillumination confirm the presence of several Class III early carious lesions, although the patient confirms that manual toothbrushing is always carried out twice daily. A discussion of the patient's dietary habits reveals nothing untoward. Which one of the options listed is the most likely oral health advice to be given to this patient?
7. A 9-year-old boy attends the practice with his family for a routine dental examination. The patient is in a mixed dentition stage, with crowded lower incisors and partially erupted lower canines. An orange rim is present along the labial margin of these teeth, which is clearly visible when the lower lip is held down. The patient's mother confirms that he routinely gets himself ready for

school while she attends to the younger sibling. Which one of the options listed is the most likely procedure to be recommended for this patient?

8. A 32-year-old policeman attends the practice with a 2-week history of hot and cold sensitivity in the upper right sextant. He is an irregular attender but leads a healthy lifestyle and was a keen cyclist, being a member of the local speed racing club for several years. Dental examination and bitewing radiographs reveal several cavities in various teeth, despite the patient following a low-sugar diet to maintain his ideal competitive cycling weight. Which one of the options listed is the oral health advice most likely to be recommended for this patient?

9. A 55-year-old shop assistant attends the practice complaining of several problem teeth, which have gradually become loose over the previous 6 months. She admits to being a smoker, but maintains her oral hygiene by vigorous brushing with a whitening toothpaste three times a day, and reports that she has never suffered from 'bleeding gums'. A BPE charting reveals scores of 3 in several sextants, and three posterior teeth are recorded as class 2 mobile. Which one of the options listed is the most likely procedure to be recommended for this patient?

Answers

Multiple choice questions

1. *Correct answer: a.* Before the use of biological enzymes as a safe alternative for stain removal, toothpastes contained abrasive products that scoured the enamel surface of the teeth. Most toothpastes containing fluoride utilise the strengthening effect of the element on enamel to help teeth resist acid attack. Stannous fluoride is specifically used to reduce thermal sensitivity, and triclosan is an antiseptic plaque suppressant.
2. *Correct answer: b.* The reduced peripheral circulation associated with diabetes leads to an increased predisposition to infections and poor wound healing. Diabetics are therefore also more likely to experience exacerbations of periodontal disease, once it has developed. Alcoholism is associated with an increased risk of oral cancer, and some eating disorders may cause enamel erosion. Heart disease and obesity have no specific links to poor wound healing and periodontal disease.
3. *Correct answer: b.* Manual toothbrushing using a conventional-head toothbrush is the least effective method of cleaning interdentally, as the bristles cannot penetrate these areas. Patients are advised to use interdental cleaning aids, such as floss and interdental brushes, or good-quality electric toothbrushes.
4. *Correct answer: b.* *Bacillus fusiformis* is an anaerobic bacterium that requires low oxygen levels to flourish and cause infection of the oral soft tissues. Mouthwashes containing hydrogen peroxide will release oxygen as they are rinsed around the mouth, making the environment less favourable for these bacteria and helping the body fight the infection that has been caused by them. None of the other options listed are mouthwashes that specifically help to fight anaerobic infections in this way.
5. *Correct answer: c.* Fluoride is known to have an inhibitory effect on the feeding rate of oral bacteria, slowing their metabolism down so that less acid is produced overall. This action helps to reduce the incidence of caries, as the natural buffering effect of the inorganic ions in saliva raises the pH level of the oral cavity, so that the acid attack ends after less demineralisation has occurred.
6. *Correct answer: c.* Making and maintaining eye contact with patients is the most important communication method to show that you are attentive to them and that they have your attention. While a smile is pleasant, it can also be vacant and is not as powerful a communication method as eye contact. The other three options listed are defensive or dismissive body language communicators, and will have the opposite effect to that required.
7. *Correct answer: a.* The weak organic acids formed by oral bacteria following food consumption has no effect on the development of gingival or periodontal disease. It is the presence of plaque in the gingival crevice causing localised

inflammation that is important in the development of these conditions. However, the formation of organic acids by bacterial plaque is crucial in the onset and progress of caries.

8. *Correct answer: c.* Any chemical compound with the suffix ‘-ol’, such as four of the options listed, indicates that it contains chemical groups associated with natural alcohols. These are the compounds from which natural sugars are derived. Saccharin is not derived from natural alcohols, and when used in food products it is several hundred times sweeter than natural sugar, making it an ideal low-calorie sugar substitute in the diet.
9. *Correct answer: a.* Normally, the sugar content of fruits is not considered cariogenic and they are therefore recommended components of a healthy diet. However, the process of converting fruits into juice breaks their cell walls and allows release of their natural sugars, which then become cariogenic if the juice is consumed in large enough volumes. All the other options listed are considered safe with regard to being sources of non-milk extrinsic sugars.
10. *Correct answer: c.* The ideal concentration of fluoride artificially added to a water supply is 1 part per million (1 ppm). This has been shown to reduce the incidence of caries in the population supplied by up to 50%. Lower concentrations are not effective in this way, and higher concentrations may cause overdose and dental problems such as fluorosis.
11. *Correct answer: b.* Citric acid is the natural acid found in fruits such as oranges, lemons, limes and grapefruit that gives them their ‘tartness’ of taste. When eaten or drunk as a fruit juice, they have considerable erosive potential on the enamel of the teeth, especially if consumed between meals or on several occasions throughout the day. Ascorbic acid is also known as vitamin C and is found in citrus fruits and some green vegetables, but it has no erosive potential. All the other options listed are not found in the diet.
12. *Correct answer: d.* All the other options listed are issues that can be overcome by good oral health advice and support from the dental team, or by the patient becoming sufficiently motivated to make lifestyle changes to benefit oral health. Physical disabilities, such as arthritis or paralysis, are much harder to manage, as little can be done to overcome them by the patient. The dental team can suggest adaptations to oral hygiene products to help, but adequate daily oral maintenance will still be the responsibility of the patient or carer.
13. *Correct answer: c.* Eating disorders such as bulimia will expose the dentition to regular bouts of acidic regurgitated food, as sufferers induce vomiting after eating meals as part of the condition. The acid contents of the stomach will repeatedly wash over the teeth, causing enamel erosion. In addition, the lack of nutrient intake will gradually result in a failure to thrive and general poor health.
14. *Correct answer: a.* The number of decayed (cariou) teeth, missing teeth (due to extraction) and filled teeth (following caries) is counted in a population and compared in areas where systemic fluoride is readily available and areas

where it is not. In the UK, the likeliest source of systemic fluoride is that provided by water fluoridation. At the ideal concentration of 1 ppm, there tends to be a reduction in caries incidence in the fluoridated population by up to 50% compared with the non-fluoridated population.

15. *Correct answer: c.* All the options are constituents of various toothpaste products, but sodium fluoride provides the topical fluoride required to help strengthen enamel by becoming incorporated into the crystal structure of the tooth surface. Biological enzymes and hydrated silica help with stain removal, sodium saccharin is a taste additive, and triclosan is an antiseptic plaque suppressant.
16. *Correct answer: d.* A high-sugar diet will not only expose the patient's dentition to frequent caries attacks, but is also highly likely to cause weight gain in all but very active individuals. As body weight increases, exercise will become more difficult to perform and the patient will gradually develop a more sedentary lifestyle. If the high-sugar diet continues, weight gain to the point of obesity is likely to occur.
17. *Correct answer: e.* Although all the options listed are available for interproximal cleaning, only the wood sticks are inflexible and cannot be bent, angled or wrapped around to effectively clean the curved surface of the tooth. Therefore, they are the most likely of the products to leave some plaque behind when used to clean these areas.
18. *Correct answer: a.* A piece of carrot contains no sugars and requires plenty of chewing before it is rendered into a bolus for swallowing. The copious chewing activity required will increase salivary flow, so that residual food debris has a good chance of being naturally washed away from the teeth and also swallowed. The inorganic ions in saliva will also neutralise the pH of the oral cavity so that demineralisation cannot occur. None of the other options listed will have such a profound 'detergent' effect.
19. *Correct answer: e.* Turning away from a patient, especially while he or she is speaking, indicates that the listener has 'switched off' and is no longer paying any attention. It is a completely dismissive action, and indicates that the patient is of no interest to the other person, or that what he or she is saying is of no relevance. Although the first three options listed are gestures that are also as rude, they are not as profoundly dismissive as turning away. Sitting down indicates that the patient has the attention of the other person.
20. *Correct answer: c.* Written protocols do not have to be learned and repeated from memory, but are always available to be referred to at the time of talking to the patient. Because they are written down, their content will not change from one patient or appointment to the next, so the same message is consistently provided by the dental team, at all times. In addition, because protocols have been developed and produced by the dental team together, they will also give information that has been accepted and agreed upon by all team members.

21. *Correct answer: b.* The constituents of a patient's diet have no effect on the occurrence or exacerbation of periodontal disease, unlike the role that diet plays in the occurrence of caries. Diet variations are not a risk factor for periodontal disease.
22. *Correct answer: c.* Unless the advice is given both verbally and in a written format, the patient must rely on memory to remember the key points given. Providing patient information leaflets on various oral health topics is a key method used by the dental team to ensure that important health advice is remembered and acted upon by the patient after leaving the surgery. Recall of the points made is far higher using this technique than if advice is just provided verbally, no matter how many times it is repeated and by how many team members.
23. *Correct answer: c.* All the other options listed are areas of the teeth that can quite easily be cleaned by the patient. The interproximal areas present a cleaning challenge to the majority of patients, unless special cleaning products and techniques are used regularly, and is the reason why the majority of demineralisation lesions begin in these areas. The application of topical fluoride, especially in full arch trays, benefits these areas the most.
24. *Correct answer: e.* At an ideal concentration of 1 ppm in the water supply to an area, fluoride produces a reduction in caries incidence in the population by up to 50% compared with non-fluoridated populations. This has been shown in many public health studies over many years.
25. *Correct answer: e.* Tobacco smoking in its many forms (cigarettes, pipes, cigars) has been linked to both oral cancer and various respiratory diseases. The nicotine and tar products gradually build up in the respiratory system, eventually preventing the body's natural protective and defence systems from working adequately. This reduces the effectiveness of the respiratory system so that breathing disorders occur, and also allows harmful carcinogens to build up over time so that cancers can develop.
26. *Correct answer: a.* Following the ban on smoking in public places, including the workplace, the number of patients in England who smoke has fallen dramatically. It is currently estimated to be around 20% of the adult population. In contrast, more than 30% of the population have a high-sugar diet, and around 50% of the population attend for regular dental examinations. The vast majority of patients undertake plaque removal daily, and very few toothpastes are available without fluoride nowadays.
27. *Correct answer: e.* Unhealthy foods tend to be those that are heavily processed, such as convenience foods, with a high carbohydrate and salt content. Healthy foods, such as fresh fruit and vegetables, and homemade meals from natural ingredients tend to be more expensive to buy. Patients on low incomes or in the lower socioeconomic classes will therefore be financially restricted to the food products they are able to buy routinely.

28. *Correct answer: c.* Leaning towards patients while they are speaking shows that they are being listened to and that what they are saying is of interest to the listener. However, the listener must ensure that they do not lean too close into the patient's personal space, as this can appear threatening. All the other options listed are actions that will be seen as dismissive by patients and will indicate that they are not being listened to, or are actually being ignored.

Extended matching questions

Oral health advice and procedures

1. *Correct answer: j.* Clean shiny enamel with thinning incisal edges is a classic sign of acid erosion. The general sensitivity of the teeth has been produced by the gradual thinning and stripping away of the enamel surface layers, so that the pulp tissue is more easily thermally stimulated.
2. *Correct answer: h.* The patient has suddenly developed gingival hyperplasia, but has had a good standard of oral hygiene previously that is still being maintained, as no plaque and calculus have been noticed by the dentist. The only other risk factor is the medication now being taken for hypertension. The patient has drug-induced gingival hyperplasia, and the tissue overgrowth requires surgical removal.
3. *Correct answer: d.* Despite the regular oral hygiene being carried out, the patient is not removing the plaque from her teeth effectively and the debris is responsible for her halitosis. During the mixed dentition stage, the teeth are notoriously difficult to keep clean by routine brushing unless the patient is aware of the many stagnation areas present. The easiest method of demonstrating this is to use disclosing tablets so that the remaining plaque can be seen easily. This should improve plaque removal.
4. *Correct answer: n.* The fractured posterior tooth requires a filling to restore it to normal function, and ensure that the symptoms experienced settle fully. Only then will a crown be considered, and it may not be necessary at all.
5. *Correct answer: c.* The tooth is already root filled and the canal is sealed with a post crown restoration. Recurrent infection has occurred at the apex of the tooth, which can be successfully managed by an apicectomy procedure. The alternatives would be to remove the post crown and perform a repeat root fill of the tooth (so requiring a new post crown), or to extract the tooth.
6. *Correct answer: e.* Despite the regular oral hygiene methods being followed, the patient is allowing sufficient interproximal plaque to remain for early cavities to form. These areas of the dentition need specific attention with regard to plaque removal in order to prevent further cavities. Of the options listed, flossing is specific to interproximal plaque removal.

7. *Correct answer: i.* Unsupervised, the young patient is missing the gingival margins of his lower teeth during toothbrushing, and the residual plaque has become stained by food products to produce the orange rim. The dentist can easily remove this by prophylactic polishing of these teeth, using paste and a polishing cup or brush.
8. *Correct answer: c.* Although the patient seems to be following a healthy diet because of his fitness regime but is still developing cavities, his diet needs analysing by the dental team to determine if any hidden sugars are being consumed. These will not be obvious sources of sugar to the patient (hence 'hidden') and are likely to be found in this case as high-energy sports drinks consumed during his cycling expeditions.
9. *Correct answer: l.* Smokers rarely complain of bleeding gums because cigarette products cause vasoconstriction. The use of a whitening toothpaste (presumably to counteract the staining produced by smoking) rather than a plaque control toothpaste will have allowed plaque and calculus to build up subgingivally, as shown by the BPE recordings. Initial treatment will be the removal of all the subgingival calculus to encourage some periodontal healing.

Multiple choice questions

1. A patient attends the surgery with a discoloured lower left central incisor and a radiograph shows that no root filling is present. The dentist arranges to test the vitality of the tooth using gutta percha. Which one of the following sensations should the patient be told to expect if the tooth is vital?
 - (a) Cold
 - (b) Hot
 - (c) No sensation
 - (d) Pain
 - (e) Tingling

2. A male patient is to attend the surgery for dental treatment under intravenous sedation. Which one of the following is the preoperative advice he should receive before undergoing this procedure?
 - (a) Arrange an adult escort
 - (b) Bring cash for a taxi home
 - (c) Do not take usual medications
 - (d) Drive to the surgery
 - (e) Starve for 6 hours beforehand

3. A female patient is to receive an inferior dental nerve block injection for the first time and has asked you to explain what it will feel like once given. Which one of the following effects of a local anaesthetic would you tell the patient to expect?
 - (a) It does not affect the soft tissues
 - (b) It is painful
 - (c) It is permanent
 - (d) It lasts a few hours
 - (e) It lasts a few minutes

4. A female patient has attended the surgery with a missing upper left lateral incisor, which she wishes to have replaced. Which one of the following dental treatments will not be discussed in this case?
 - (a) Acrylic partial denture
 - (b) Chrome partial denture
 - (c) Porcelain bonded cantilever bridge
 - (d) Porcelain bonded crown
 - (e) Titanium implant
5. A teenage patient is considering whether to undergo orthodontic treatment to correct his malocclusion and has asked what is likely to be done at the initial assessment appointment. Which one of the following treatments will not be carried out at this appointment?
 - (a) Bonding
 - (b) Impression taking
 - (c) Oral hygiene instruction
 - (d) Photographs
 - (e) Radiographs
6. When patients attend the surgery for a dental examination, their level of knowledge and skill in relation to their own oral health will be assessed by the dental team. Which one of the following is the most likely issue that can be altered by the team?
 - (a) Disability
 - (b) Health condition limiting plaque removal
 - (c) Level of interest shown
 - (d) Previous advice given
 - (e) Serious medical problem
7. A patient has had an upper chrome partial denture fitted and is receiving her wearing and maintenance instructions from the dentist. Which one of the following instructions will not be given to this patient?
 - (a) Attend recall appointments
 - (b) Clean with toothpaste and water
 - (c) Handle over bowl of water
 - (d) Immerse in hypochlorite
 - (e) Remove at night
8. A patient attends the surgery as an emergency, following fracture of the lower left second molar tooth. The dentist recommends that the tooth is extracted and arranges to take a radiograph of the tooth first. Which one of the following is the reason for taking the radiograph?
 - (a) Check for bone loss
 - (b) Check for caries
 - (c) Check for root curvatures

- (d) Check for root filling
 - (e) Check the number of roots
9. Information received from patients about their attitudes to oral health issues, and their motivation to improve their oral health, will vary between age groups. Which one of the following difficulties must be overcome by the dental team before progress can be made with adult patients?
- (a) Bad habits already present
 - (b) Immature attitude
 - (c) Parental influence
 - (d) Peer pressure
 - (e) Short attention span
10. A patient has attended the surgery for the cementation of a three unit fixed-fixed bridge to replace the missing upper right central incisor. Which one of the following oral health products should be recommended to the patient for regular use now the bridge has been fitted?
- (a) Dental tape
 - (b) Interspace brush
 - (c) Mouthwash
 - (d) Superfloss
 - (e) Toothbrush
11. A teenage patient has attended the surgery for an orthodontic assessment, with a view to having orthodontic treatment. Which one of the following reasons for orthodontic treatment is appropriate in this case?
- (a) Improve aesthetics
 - (b) Improve functional occlusion
 - (c) Improve oral hygiene
 - (d) Patient request
 - (e) Reduce caries incidence
12. A patient attends the surgery with a discoloured upper right central incisor, and a radiograph shows that no root filling is present. The dentist arranges to test the vitality of the tooth using ethyl chloride. Which one of the following sensations should the patient be told to expect if the tooth is vital?
- (a) Cold
 - (b) Hot
 - (c) No sensation
 - (d) Pain
 - (e) Tingling
13. A patient attends the surgery with the upper left incisor teeth fractured at the gingival margin following a car accident. Which one of the following medical

conditions would persuade the dentist to recommend extraction rather than root canal therapy in order to avoid bacteraemia?

- (a) Angina
 - (b) Emphysema
 - (c) Epilepsy
 - (d) Haemophilia
 - (e) Valvular heart disease
14. A patient attends the surgery with a Class II cavity in the lower right second molar tooth, with a lingual extension. Which one of the following is the dentist most likely to recommend to the patient as initial treatment for this tooth?
- (a) Amalgam restoration
 - (b) Extraction
 - (c) Glass ionomer restoration
 - (d) Porcelain bonded crown
 - (e) Root canal therapy
15. Following the placement of a composite restoration under local anaesthesia in the upper right central incisor, the dentist advises the patient not to attempt to eat anything until the anaesthetic has worn off. Which one of the following is the reason for this advice?
- (a) Allow the filling to set fully
 - (b) Avoid damage to the tooth
 - (c) Avoid dislodging the filling
 - (d) Avoid soft tissue trauma
 - (e) Avoid staining the filling
16. A patient attends for the extraction of an upper right first premolar tooth, and admits it is his first experience of an extraction. You explain to the patient that he should not feel which one of the following sensations?
- (a) Bleeding
 - (b) Numbness
 - (c) Pain
 - (d) Pressure
 - (e) Pushing
17. A patient has had an immediate replacement acrylic denture fitted, after the extraction of the four upper incisors at the fit appointment. The dentist advises waiting for what length of time before considering a replacement denture?
- (a) 3 months
 - (b) 6 months
 - (c) 12 months
 - (d) 18 months
 - (e) 24 months

18. A patient attends the surgery with a discoloured upper left lateral incisor tooth, which was root filled many years ago, and asks for advice on improving the appearance of the tooth. Which one of the following treatments is likely to be recommended by the dentist?
- (a) Full gold crown
 - (b) Implant
 - (c) Porcelain bonded crown
 - (d) Porcelain jacket crown
 - (e) Porcelain veneer
19. A teenage patient has just had a fixed orthodontic appliance bonded to her upper teeth to correct a malalignment. Which one of the following oral health aids should be recommended for cleaning around the brackets?
- (a) Dental floss
 - (b) Dental tape
 - (c) Interspace brush
 - (d) Superfloss
 - (e) Toothbrush
20. A patient attends the surgery with a discoloured lower right lateral incisor and a radiograph shows that no root filling is present. The dentist arranges to test the vitality of the tooth using an electric pulp tester. Which one of the following sensations should the patient be told to expect if the tooth is vital?
- (a) Cold
 - (b) Hot
 - (c) No sensation
 - (d) Pain
 - (e) Tingling
21. A patient is undergoing the procedure of having a lower acrylic partial denture constructed, and the dentist has advised that stainless steel clasps are incorporated into the design. Which one of the following is the reason for their use?
- (a) Avoids food trapping
 - (b) Avoids lisping
 - (c) Improved aesthetics
 - (d) Improved fit
 - (e) Improved retention
22. A patient is to attend for a crown preparation on the upper left first molar tooth, which is heavily filled. The dentist arranges to take a radiograph of the tooth beforehand. Which one of the following is the reason for taking the radiograph?
- (a) Check for periapical disease
 - (b) Check for root curvature

- (c) Check the depth of the filling
 - (d) Check the margins of the filling
 - (e) Check the number of roots
23. A patient re-attends the surgery 6 hours after having a tooth extracted that morning, complaining that the socket has started bleeding again. Which one of the following is the initial treatment?
- (a) Irrigate the socket
 - (b) Place a bite pack
 - (c) Place an antiseptic dressing
 - (d) Prescribe antibiotics
 - (e) Suture the socket
24. A patient attends for root canal therapy and restoration of the upper right canine tooth, following its loss of vitality after a blow to the face. Which one of the following medical conditions must be ruled out before proceeding with the endodontic treatment?
- (a) Asthma
 - (b) Bronchitis
 - (c) Eczema
 - (d) Latex allergy
 - (e) Penicillin allergy
25. A patient attends the surgery after an absence of 3 years, complaining that his upper full acrylic denture has become loose. Which one of the following is the dentist most likely to recommend that will solve the problem?
- (a) Add stainless steel clasps
 - (b) Advise to use denture fixative
 - (c) Reline the denture
 - (d) Remake the denture
 - (e) Replace with new chrome denture
26. The mother of a 10-year-old patient has phoned the surgery requesting emergency advice, after the child has avulsed the upper right central incisor in an accident. Which one of the following is the advice that will be given regarding care of the tooth before attending the surgery?
- (a) Clean with toothpaste
 - (b) Pack in ice
 - (c) Store in disinfectant solution
 - (d) Store in milk
 - (e) Wrap in a tissue
27. A patient has attended for an amalgam restoration of her carious lower left second premolar under local anaesthesia. The dentist administers a mental nerve block injection and the patient asks which areas of her mouth will be

- numb. Which one of the following is the correct response to the patient's query?
- (a) All lower left anterior teeth and tongue
 - (b) All lower left teeth and buccal soft tissues
 - (c) Anterior lower left teeth and all soft tissues
 - (d) Anterior lower left teeth and their buccal soft tissues
 - (e) Anterior lower left teeth, their buccal soft tissues and tongue
28. A patient re-attends the surgery 3 days after having a tooth extracted, complaining of pain at the extraction site. Which one of the following is the most likely cause of the problem?
- (a) Cellulitis
 - (b) Gingivitis
 - (c) Localised osteitis
 - (d) Pericoronitis
 - (e) Periodontal abscess
29. A teenage patient has had a functional orthodontic appliance fitted to correct a malocclusion. Which one of the following is the advice that should be given to the patient?
- (a) Clean appliance after meals
 - (b) Clean teeth twice daily
 - (c) Remove at mealtimes
 - (d) Wear at night only
 - (e) Wear during the day only
30. A patient attends the surgery for his initial dental examination and admits to being very nervous of receiving any dental treatment without some form of anxiety control. His completed medical record shows a history of jaundice. Which one of the following anxiety control techniques will the dentist consider using for this patient?
- (a) Dual drug intravenous sedation
 - (b) General anaesthesia
 - (c) Inhalation sedation
 - (d) Oral sedation
 - (e) Single drug intravenous sedation
31. A patient has undergone the successful surgical extraction of the lower right third molar tooth under local anaesthesia. She has received her postoperative instructions verbally, and has asked you to clarify the information she was given about analgesics. Which one of the following analgesics should be avoided by the patient?
- (a) Aspirin
 - (b) Co-codamol
 - (c) Codeine

- (d) Ibuprofen
 - (e) Paracetamol
32. A male teenage patient has attended the surgery for an orthodontic assessment and his Index of Treatment Needs (IOTN) score has been determined as 5a, making him suitable for treatment. Which one of the following treatment risks will not require discussion with this patient?
- (a) Caries incidence
 - (b) Contact sports participation
 - (c) Exacerbation of periodontal disease
 - (d) Labial erosion
 - (e) Root resorption
33. Following the extraction of the upper right first and second molar teeth, you are asked to give the patient his postoperative instructions. Which one of the following activities is likely to result in reactionary haemorrhage if your advice is ignored?
- (a) Eating a meal
 - (b) Having a cigarette
 - (c) Lying down
 - (d) Rinsing the mouth
 - (e) Watching television
34. A teenage patient has had fixed appliances bonded to both arches and you have been asked to provide the postoperative advice. Which one of the following products should you recommend to help avoid ulceration?
- (a) Disclosing tablet
 - (b) Fluoride mouthwash
 - (c) Interspace brush
 - (d) Soft toothbrush
 - (e) Wax
35. A patient has undergone the successful extraction of the upper left first molar tooth, and has been given postoperative advice to avoid any complications developing in the following 24 hours. Which one of the following is likely to have no effect on the occurrence of reactionary haemorrhage?
- (a) Alcohol
 - (b) Exercise
 - (c) Food
 - (d) Hot drink
 - (e) Rinsing

Extended matching questions

Postoperative advice

For each of the following postoperative scenarios, select the single most appropriate point of advice or instruction from the option list. Each option might be used once, more than once, or not at all.

- (a) Avoid alcohol
 - (b) Avoid chewing
 - (c) Avoid contact sports
 - (d) Avoid exercise
 - (e) Avoid smoking
 - (f) Use of antibiotics
 - (g) Use of anti-inflammatory
 - (h) Use of bite pack
 - (i) Use of fluoride mouthwash
 - (j) Use of mouthguard
 - (k) Use of superfloss
1. A patient has undergone a bonding procedure to have an upper fixed orthodontic appliance fitted. Treatment had been delayed while the patient improved his diet with regard to his intake of carbonated drinks. Which one of the options listed is advice that the dentist is most likely to give in an effort to prevent caries?
 2. A patient attended the surgery 2 hours previously for a simple extraction procedure for the removal of an upper left first premolar tooth. She has phoned the surgery to report that the socket has started to bleed again. Which one of the options listed is the initial advice that the dentist is most likely to provide in order to produce haemostasis?
 3. A patient has attended the surgery complaining of pain in front of his ears and a clicking sensation when opening her mouth. The dentist has seen the patient previously and recommended relaxation exercises, but the patient is undergoing university examinations and is anxious and stressed. Which one of the options listed is the advice most likely to be given in an effort to reduce the physical strain on the oral musculature that is causing the pain?
 4. A patient has had a four unit fixed–fixed bonded bridge cemented, to replace her missing upper left central and lateral incisors. She had worn a partial denture for several years following the accident that resulted in the tooth loss. Which one of the options listed is the advice most likely to be given to ensure effective cleaning of the pontic region of the bridge?

Answers

Multiple choice questions

1. *Correct answer: b.* Gutta percha is a rubber-based material with various uses in dentistry. When warmed in a flame, it retains heat and can be placed against the buccal or labial surface of a vital tooth and the patient will experience the warmth of the material. To avoid the material becoming stuck to the tooth, it can be smeared lightly with vaseline first.
2. *Correct answer: a.* The effects of the intravenous drug will remain with the patient for the remainder of the day, so he must be escorted to and from the dental premises by a responsible adult. None of the other options listed are correct or relevant preoperative advice to give to the patient in these circumstances.
3. *Correct answer: d.* The patient must be warned that local anaesthetic effects on the teeth and soft tissues will take several hours to wear off, so that she does not inadvertently bite herself during this period. Although sometimes uncomfortable, the injection should not be painful nor its effects permanent.
4. *Correct answer: d.* A missing tooth cannot be replaced by a crown alone, as the crown must be cemented to a retained root or to an implant. Any of the other options listed are all suitable methods for replacing a missing tooth.
5. *Correct answer: a.* Until the dentist has assessed the malocclusion present and taken the necessary radiographs, photographs and impressions for study models, a decision cannot be made about treatment. A fixed appliance may not even be an option, so the patient will not usually undergo a bonding procedure at the initial appointment.
6. *Correct answer: c.* One of the key aims of oral health instruction is to determine the patient's level of motivation and improve it if at all possible. None of the other options listed can be altered by the dental team.
7. *Correct answer: d.* Sodium hypochlorite is bleach and it has a detrimental effect on most metals, blackening and pitting the surface over time. Denture cleaning products containing bleach are therefore not normally recommended to patients when chrome cobalt dentures have been provided. Soap or toothpaste will be recommended instead. All the other options listed are points of advice given to all denture wearers.
8. *Correct answer: c.* Root curvatures could make a straightforward extraction procedure far more complicated and time-consuming, and the dentist needs to plan for this eventuality before beginning the procedure. This involves the taking of (usually) a periapical radiograph, so that previously unknown potential problems can be managed during the extraction. None of the other options listed are relevant to the planning of a tooth extraction, although they would be relevant if other treatment was planned.

9. *Correct answer: a.* Adult patients will have acquired various habits and beliefs over the years that may affect their attitude and motivation towards oral health issues. They may be smokers, or have jobs that make regular oral hygiene efforts difficult, or have set dietary patterns that are damaging to the teeth – many issues could be applicable. Persuading patients to change their attitude or motivating disinterested patients to take better care of their oral health can be an uphill struggle for the dental team. All the other options listed are more relevant to younger patients and children.
10. *Correct answer: d.* A fixed–fixed bridge has a pontic that replaces the missing tooth, set between two bridge retainers, as a solid restoration. Once the bridge has been cemented into place, the gingivae beneath the pontic and the adjacent margins of the two abutment teeth will be inaccessible to routine toothbrushing. Dental tape cannot be used because the restoration is a solid structure, and an interspace brush will be too bulky to access the area. Superfloss is specially designed to be threaded beneath the pontic and clean this area, physically removing food particles and plaque as it is used. Mouthwash will only remove loose particles and debris.
11. *Correct answer: b.* Although many patients request orthodontic treatment, especially to improve their aesthetics, it is not the most likely reason for treatment to be provided in the absence of clinical need. Well-motivated patients with good oral hygiene skills and a healthy diet should be able to maintain a good standard of oral health, no matter how overcrowded and crooked their teeth appear. Providing or improving a functional occlusion is the main clinical reason for carrying out orthodontic treatment.
12. *Correct answer: a.* Ethyl chloride is a colourless liquid that evaporates rapidly in air at normal room temperature. When a cottonwool pellet is soaked in the liquid, ice crystals immediately form as the liquid evaporates and the pellet surface is cold to the touch. When applied to a dried tooth surface, the patient should experience that coldness if the tooth is vital. Hot, pain and tingling are sensations that may be generated using other vitality testing methods, but if the patient experiences no sensation then it is likely that the tooth is non-vital.
13. *Correct answer: e.* Patients with valvular heart disease are at risk of developing bacterial endocarditis if bacteraemia occurs. Such an event may occur during dental treatment, when oral bacteria manage to invade the patient's circulatory system following procedures such as extraction, oral surgery or endodontics. In this case, as several teeth are involved that will require endodontic treatment, the risk is increased. None of the other options listed are medical conditions that contraindicate root canal therapy.
14. *Correct answer: a.* Initial treatment will involve the rebuilding of the tooth using a filling material that can withstand the occlusal forces placed on molar

teeth. Of the options listed, only amalgam is capable of this. Root canal therapy or extraction would not be required unless the tooth is symptomatic, and provision of a crown would be unnecessary initially, for a routine-sized restoration such as this.

15. *Correct answer: d.* Local anaesthetics can take several hours for their effects to wear off completely, and they anaesthetise both the teeth and their surrounding soft tissues. If patients attempt to chew food during this period, they will be unaware of biting and traumatising their soft tissues, and can cause themselves quite an amount of damage in doing so. Modern composites will set immediately and their surface will not stain initially, a correctly placed filling should not dislodge, and the tooth will not be prone to damage while anaesthetised.
16. *Correct answer: c.* When a tooth and its associated soft tissues have been correctly anaesthetised, a patient should not experience any pain during an extraction procedure. All the other options listed are likely to occur during this treatment.
17. *Correct answer: b.* The majority of the bone resorption that naturally occurs following tooth extraction does so in the first 6 months of the post-extraction period. During this time, the alveolar process gradually decreases in height, and the immediate denture may lose its fit as spaces develop beneath it in the area of the extraction. Temporary improvement in the fit may be provided by the dentist carrying out a chair-side reline procedure. After 6 months, so little further resorption is likely to occur that a replacement denture may be made, which should then last for several years.
18. *Correct answer: e.* As the tooth has been root filled for many years, it is likely to be brittle and should therefore have the minimum amount of its structure removed during restoration. This is achieved by a veneer preparation involving the removal of just the labial enamel, rather than the full tooth reduction of a crown preparation. An implant would involve the extraction of the tooth beforehand.
19. *Correct answer: c.* An ordinary toothbrush will be unable to clean the tooth surface beneath the archwire of the appliance and will therefore not remove debris around the brackets. Floss, tape and superfloss are all designed for interproximal cleaning, and superfloss additionally for bridge pontic débridement. The tufted head of the interspace brush will pass beneath the archwire and enable adequate cleaning of the individual brackets.
20. *Correct answer: e.* Electric pulp testers transmit a low-voltage electrical current from their tips when touched against the dried surface of a tooth. The patient will experience this as a tingling sensation if the tooth is still vital. The voltage range is very carefully increased until the patient first experiences sensation. It is then immediately stopped, as the higher voltage may become painful.

21. *Correct answer: e.* Stainless steel clasps are used to grip around available standing teeth and improve the denture's retention, so that it does not drop out or become dislodged during speech and chewing activities. They are especially useful in suitable cases to help retain lower partial dentures, which have so little availability for natural retention otherwise. Clasps can also be constructed from chrome cobalt when used as part of a chrome denture design, or even from wire coated in tooth-coloured acrylic to improve aesthetics.
22. *Correct answer: a.* A tooth that has been heavily filled is more likely to have a chronically irritated pulp than one that has not. The tooth may well have been asymptomatic in this condition for years, but the additional tooth removal required during the crown preparation procedure may be enough to cause an inflammatory response and pulpitis. A radiograph taken before the crown preparation procedure will allow the dentist to rule out, or plan for, this complication and treat the tooth accordingly.
23. *Correct answer: b.* The patient is experiencing reactionary haemorrhage, which occurs when the initial blood clot that forms in the tooth socket after the extraction procedure is disturbed or even dislodged, allowing bleeding to start again. The initial treatment should be to compress the minor blood vessels around the socket until coagulation occurs again, and the bleeding stops. This is achieved by having the patient bite on a pack laid across the socket, for up to 30 minutes. If this fails, the soft tissues around the socket may then require suturing. The other options listed may be required when localised osteitis is present.
24. *Correct answer: d.* Endodontic treatment is often carried out under rubber dam, to provide the best standard of moisture control as well as to protect the patient's airway. Although latex-free dam sheets are now available, they are not always used in the surgery. Use of latex dam sheets on a patient with latex allergy could precipitate an anaphylactic reaction, and their use on these patients is strongly contraindicated.
25. *Correct answer: c.* An acrylic denture normally has a lifespan of at least 5 years, very often much longer when well cared for by the patient. Bone resorption of the alveolar processes after tooth loss is a normal and continuous process, and it is inevitable that it will result in the loss of fit of a denture with time. As this denture is only 3 years old, a hard reline of its fit surface will improve retention immediately and avoid the cost of a new denture. Clasps cannot be used with full dentures, as there are no standing teeth present. Only under certain circumstances should a patient require the long-term use of a denture fixative.
26. *Correct answer: d.* The aim of emergency treatment in this instance is to prevent damage to the cementum surface of the root, so that re-implantation of the tooth will be followed by reattachment of the periodontium to the root.

Damage to the cementum by chemicals, ice or physical contact is likely to prevent this, and the safest action to take is to carefully place the tooth in milk. This is a neutral biocompatible solution that is unlikely to have an adverse effect on the cementum.

27. *Correct answer: d.* The mental nerve exits the mandible in the premolar region, and supplies these teeth forwards to the midline and their buccal soft tissues. The lingual nerve supplies the lingual soft tissues, and the lower molar teeth are supplied by the inferior dental nerve trunk.
28. *Correct answer: c.* Localised osteitis, or 'dry socket', is a common postoperative complication of extraction, where the bone lining of the socket becomes acutely inflamed and infected. It is a very painful condition, and usually occurs 2–3 days after the extraction, often following disturbance or loss of the blood clot from the socket. Cellulitis occurs when a localised area of infection (such as an abscess) spreads further into the surrounding soft tissues. The other three options listed can only occur in association with the presence of a tooth.
29. *Correct answer: c.* A functional appliance is used to correct skeletal discrepancies, especially Class II division 1 cases, by using the muscular forces of the oral cavity to guide mandibular growth. It is a bulky appliance and cannot be worn during meals as the patient could not possibly eat with it in place. Otherwise it is worn 24 hours a day to achieve the best results.
30. *Correct answer: c.* All the other options involve the use of intravenous drugs to control the patient's anxiety, which will be metabolised and removed from the body after being broken down and detoxified by the liver. Jaundice is a condition where excessive bile pigments are present in the blood and is an indication of a malfunctioning liver. The gases used in inhalation sedation are not absorbed and metabolised by the liver, but are simply exhaled from the lungs.
31. *Correct answer: a.* Aspirin has anticoagulant properties and should therefore not be advised as a suitable analgesic following any type of surgical procedure, otherwise recurrent bleeding is likely and may even require hospital intervention to control. All the other options listed are suitable analgesics following a surgical procedure.
32. *Correct answer: b.* An IOTN score of 5a indicates that the patient has a large overjet, quite probably involving severely proclined upper incisors. These teeth will be particularly vulnerable to injury while malaligned, and the patient will have been advised not to participate in contact sports anyway, even before commencing orthodontic treatment. All the other options listed are known risk factors of orthodontic treatment that should be discussed with child and adult patients.
33. *Correct answer: d.* Postoperative instructions following a tooth extraction will always include the advice not to rinse the mouth out on the day of the

procedure, otherwise the blood clot may be disturbed. If this happens, the socket is likely to begin bleeding several hours after the procedure – this is referred to as reactionary haemorrhage.

34. *Correct answer: e.* Orthodontic wax can be used to cover the individual metal components of the appliances and prevent them from rubbing the cheeks and lips, causing ulceration. None of the other options listed are specifically recommended for this purpose, and are unlikely to be successful anyway.
35. *Correct answer: c.* Once the local anaesthetic effects have worn off, the patient may eat a meal as long as care is taken to avoid the extraction site as much as possible. Soft non-spicy food is usually recommended. Any of the other options listed are likely to result in the occurrence of reactionary haemorrhage.

Extended matching questions

Postoperative advice

1. *Correct answer: i.* The routine use of a fluoride mouthwash during a course of fixed orthodontic treatment is recommended to many patients, but is of particular relevance to this patient as he has a history of poor diet. It is possible his good intentions will slip at some point during the treatment, and any potential enamel damage can be counteracted by the fluoride mouthwash.
2. *Correct answer: h.* After such a short post-extraction time, it is highly likely that the patient did not follow the postoperative instructions fully so that bleeding has started again. In the absence of medical conditions or infection, the use of a bite pack for 30 minutes should produce haemostasis again.
3. *Correct answer: j.* Despite her best intentions, the patient is likely to continue the bruxing that has caused these symptoms, at least until her examinations are completed. The provision of a mouthguard will physically open the bite slightly so that the muscles are less strained and hopefully allow their spasms to settle. Anti-inflammatory medication will help to chemically reduce the inflammation of the muscles, but will have no physical effect on them.
4. *Correct answer: k.* Supefloss has been specifically designed for use in cleaning the pontic areas beneath bridges. The stiff end is threaded beneath the pontic and drawn through, so that the thicker spongy section can be drawn over the areas to be cleaned. Once clean, the full length of the floss end is withdrawn from beneath the pontic.

Multiple choice questions

1. An important requirement when taking patients' medical history is to check their medication to ensure it does not contraindicate dental treatment. Details of medications can be found in which one of the following publications?
 - (a) A1 advice sheet
 - (b) British National Formulary
 - (c) CQC registration document
 - (d) GDC Standards booklet
 - (e) HTM 01-05 document
2. A patient's dental records must remain confidential except in certain permitted circumstances. This is a legal requirement under the regulations laid out in which one of the following?
 - (a) Data Protection Act
 - (b) Dentists Act
 - (c) GDC Standards
 - (d) Health and Safety Act
 - (e) RIDDOR
3. Patient records are legal documents that provide a wealth of information about patient attendance, treatment, personal details, and attitudes to oral healthcare. When an adult patient leaves the dental surgery, it would be ideal for the records to be kept forever. However, legally they only need to be kept for what length of time?
 - (a) 5 years
 - (b) 7 years
 - (c) 9 years
 - (d) 11 years
 - (e) 13 years

4. An important component of a patient's dental records is a completed medical history form. This should be kept with the rest of the patient's records, but only requires updating under which one of the following circumstances?
 - (a) After a serious illness
 - (b) At a dental examination
 - (c) At first attendance
 - (d) Before taking radiographs
 - (e) Once a year
5. An important part of the day-to-day duties of all dental team members is to record the personal and clinical details of all patients, and their treatment sessions. These records should always be contemporaneous. Which one of the following indicates the correct meaning of this term?
 - (a) Accurate
 - (b) Date ordered
 - (c) Legible
 - (d) Signed off
 - (e) Using correct terminology
6. Patient records are legal documents that provide a wealth of information about patient attendance, treatment, personal details, and attitudes to oral healthcare. When a child patient leaves the dental surgery, it would be ideal for the records to be kept forever. However, legally they only need to be kept until the patient is what age?
 - (a) 16 years old
 - (b) 18 years old
 - (c) 21 years old
 - (d) 25 years old
 - (e) 30 years old
7. As part of the regulations governing the use of ionising radiation in the dental workplace, written information about the controlled area must be kept on display at each X-ray machine. Which one of the following describes the title of this written information?
 - (a) IR(ME)R
 - (b) IRR 99
 - (c) Local Rules
 - (d) Quality Assurance programme
 - (e) Radiation Protection file
8. When patients attend the dental surgery for treatment, they must be given certain information by the dental team before they can decide if they wish to proceed with the treatment or not. This is termed valid consent. Which one of the following is not necessary for consent to be valid?
 - (a) Agreed in writing

- (b) Detail all costs
 - (c) Give full information
 - (d) Given voluntarily
 - (e) Specific to the treatment
9. Various regulations and legislations apply to the safe running of dental workplaces. Which one of the following applies to the COSHH regulations?
- (a) Accidents at work
 - (b) Chemicals
 - (c) Fire extinguishers
 - (d) Pressure vessels
 - (e) Radiation hazards
10. Throughout their dental career, all dental personnel are required to act in the best interests of the patient. Unfortunately, a small minority of dental team members fail to follow this requirement at all times. Before statutory registration of DCPs began, only the dentist would have been held responsible for these failures. Which one of the following terms best describes this fact?
- (a) Breach of confidentiality
 - (b) Indemnity
 - (c) Omission
 - (d) Valid consent
 - (e) Vicarious liability
11. From time to time, it may be necessary to release confidential information about a patient to a third party, without the patient's consent. Which one of the following organisations is a source of advice on the legalities of this issue?
- (a) Care Quality Commission
 - (b) Defence organisation
 - (c) Department of Health
 - (d) General Dental Council
 - (e) Primary Care Trust
12. From time to time, it may be necessary to share confidential information about patients without their consent, because it is in the public interest to do so. Which one of the following describes the circumstance where this does not apply and the information should not be released?
- (a) After the patient's death
 - (b) Detection of a serious crime
 - (c) Prevention of a serious crime
 - (d) Under a court order
 - (e) Where the patient's health is at risk
13. Accurate record-keeping is a legal requirement for all dental surgeries, covering many of the daily procedures and processes carried out on the

- premises. A consignment note is one such record. Which one of the following requires a consignment note?
- (a) Autoclave testing
 - (b) COSHH
 - (c) Radiation
 - (d) Waste disposal
 - (e) Waterline contamination
14. In certain circumstances, it is acceptable for the dental surgery to release personal details to a third party, without the patient's written permission. To which one of the following persons can details be given?
- (a) Bailiff
 - (b) Employer
 - (c) Headmaster
 - (d) Husband or wife
 - (e) Tax inspector
15. Various items of legislation are in place to ensure the safe use of radiation in the dental workplace. Every dental surgery has to ensure that all staff comply fully with this legislation, and must have an appointed person to do so. Which one of the following is the title of this appointment?
- (a) Health and Safety Executive
 - (b) Health Protection Agency
 - (c) Legal Person
 - (d) Radiation Protection Advisor
 - (e) Radiation Protection Supervisor
16. Patients have the right of access to their own health records, if written after 1991. In order to comply with this right, the patient and the dental surgery personnel must abide by which one of the following options?
- (a) Access approved by record holder
 - (b) Give written receipt
 - (c) Release to family member
 - (d) Respond to request within 10 days
 - (e) Verbal request for access
17. Under the GDC 'Scope of Practice' publication, the dental nurse may carry out additional duties after receiving suitable training. This training is often given on the dental premises and by a work colleague, with written records kept as evidence of the training received. Which one of the following tasks requires both assessment and qualification before the dental nurse can carry it out?
- (a) Assist in special waste disposal
 - (b) Change processing solutions
 - (c) Expose films

- (d) Process films
 - (e) Run a quality assurance programme
18. While attending the dental surgery for a routine restorative procedure, a patient trips on the stairs and fractures her right arm. Which one of the following regulations should be followed in order to determine the cause of the fall?
- (a) COSHH
 - (b) CQC
 - (c) HTM 01-05
 - (d) IR(ME)R
 - (e) RIDDOR

Answers

Multiple choice questions

1. *Correct answer: b.* The British National Formulary is a joint publication by the British Medical Association and the Royal Pharmaceutical Society. It is a biannually produced reference book that aims to provide all prescribers, pharmacists and healthcare professionals with current information on the use of medicines. Within the publication is a section on dental prescribing that is of particular importance to the dental profession, but of course information on all the medicines covered is of great use when checking a patient's medical history.
2. *Correct answer: a.* The Data Protection Act includes regulations that lay down the permitted circumstances that allow the release of confidential dental records. The GDC Standards document 'Principles of Patient Confidentiality' clearly states that it deals only with the ethical issues around protecting patient confidentiality, not the legal issues to which the question refers. None of the other options listed are relevant to patient confidentiality issues.
3. *Correct answer: d.* For adult patients, all records are required to be kept for a minimum of 11 years after the end date of the last course of treatment provided at the dental surgery. If the patient re-attends during this time, the date extends to 11 years after the end date of the subsequent treatment course.
4. *Correct answer: b.* The medical record of every patient should be updated at the start of every treatment course, when the patient attends either for a routine dental examination or with a dental problem. This is irrespective of their dental recall interval. Any medical investigations or diagnoses that have occurred should be recorded, as well as any changes to medications or new medications that have been prescribed.
5. *Correct answer: b.* Dental records giving details of attendance, and treatment discussed and received at each appointment, must be recorded as happening in the date order that they occurred. This ensures that the record is a true reflection of events as they unfolded. If any complaints or problems develop in the future, it is possible to trace back the sequence of events to determine if there were any errors or omissions on the part of the dental team. This is of particular importance when certain treatment is advised by the dentist but not agreed to by the patient at the time, and then associated problems develop in the future.
6. *Correct answer: d.* Children reach majority or adulthood at the age of 18 years, although some individuals are deemed capable of making decisions about their dental treatment, and giving consent for it, at a younger age. Once they have left a dental practice as a patient though, irrespective of their actual age or their level of maturity, their records need only be retained until they reach the age of 25 years.

7. *Correct answer: c.* The Local Rules are specific for each X-ray machine with regard to some of the information that must be shown, such as details of the controlled area and the correct working instructions. Other information that must be displayed will be common to all machines on the premises, such as details of the designated Radiation Protection Supervisor (RPS) and Radiation Protection Advisor (RPA), and the presence of controlled area warning signs. All the other options listed are generic details for the whole workplace, rather than specific (local) details for each machine.
8. *Correct answer: a.* While it is considered best practice for all treatment courses to be agreed in writing, it is not necessary to do so in every case and is therefore not a requirement for consent to be valid. Ideally, all extensive, complicated and expensive courses of treatment should be covered by a written agreement, as should any course involving sedation techniques. In all cases, the patient must be issued with a written and itemised estimate of the proposed treatment plan.
9. *Correct answer: b.* The Control of Substances Hazardous to Health (COSHH) regulations provide an easy to use method of risk assessing chemicals used in the workplace, and provide advice on their safe management and avoidance of injury.
10. *Correct answer: e.* This was the term used to describe the employing dentist's sole responsibility for the actions or omissions of all their staff, before statutory registration of all dental care professionals began. Although the employer is still responsible for ensuring that all staff are trained in the correct workplace protocols and procedures, so that mistakes do not happen, the staff now also have a responsibility to act in accordance with the principles laid down in the GDC document 'Standards for Dental Professionals'. Failure to do so by their own choice renders the staff member liable now.
11. *Correct answer: b.* While the General Dental Council have released their 'Standards Guidance' documents giving advice on the ethical issues to be considered in relation to patient confidentiality, it is the Defence organisations that have full knowledge of the legal issues to be considered. Members can request their legal advice on this topic, and many others besides.
12. *Correct answer: a.* All of the other options listed are circumstances where confidential information can be shared with others, without the patient's consent, and without the fear of retribution from the patient or their family. However, even after death, the patient's records must remain confidential unless they have specifically waived their right to confidentiality under the terms and conditions of their Will.
13. *Correct answer: d.* Consignment notes are issued by specially licensed waste disposal companies to any premises where they are contracted to collect and dispose of hazardous or special waste. This includes dental workplaces, whose

duty it is to ensure the waste is stored safely and disposed of correctly. Both parties must sign and keep copies of the consignment notes for up to three years, with their details and identification tag numbers of each consignment listed on them.

14. *Correct answer: a.* In cases of the non-payment of dental charges by a patient, the dental surgery may appoint a debt collection agency to act on their behalf to recover the debt. In these circumstances, a bailiff is an official with the legal authority to serve writs and seize assets on behalf of the dental surgery, and to do so they will require the personal details of the patient involved, and can receive them without the patient's permission.
15. *Correct answer: c.* The Legal Person is usually the senior dentist in the workplace, although it can alternatively be a suitably qualified and trained member of staff. It is their duty to ensure that all team members comply fully with all of the ionising radiation legislation and regulations covered by IRR 99 and IR(ME)R.
16. *Correct answer: a.* Only the record holder can approve access, and this will usually be the dentist. No other member of staff can agree to the patient's right of access to their dental records on behalf of the dentist, or in their absence. The records can only be released to the patient themselves after a written request for access has been made, and the record holder has up to forty days to respond to the request. The record holder would not issue a receipt, as they are providing the records, not receiving them.
17. *Correct answer: c.* Only dental nurses who have attended an appropriate dental radiography training course, and been successful in the associated examination for that subject, can expose a patient to ionising radiation legally. Any of the other options listed can be carried out by any member of staff, once they have received the suitable training required.
18. *Correct answer: e.* The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) deal specifically with categorised serious injuries that occur in the workplace, such as a fractured limb. COSHH deals with the risk assessment and management of chemicals, CQC is an organisation concerned with workplace registration, HTM 01-05 is concerned with infection control procedures, and IR(ME)R deals with ionising radiation regulations.



Domain 4: Management and Leadership

Multiple choice questions

1. At the beginning of the working day at your surgery, you are asked to run a cycle of the steam autoclave and record the parameters in the log book provided. Which one of the following autoclave temperatures is required to achieve sterilisation?
 - (a) 128°C
 - (b) 130°C
 - (c) 132°C
 - (d) 134°C
 - (e) 136°C

2. An important method of reducing the risk of cross-infection at your dental workplace is to carry out routine hand-washing techniques throughout the working day. Regular washing of hands with soap and water, especially after using the toilet, will help to prevent the spread of which one of the following infectious conditions?
 - (a) AIDS
 - (b) *Clostridium*
 - (c) Hepatitis B
 - (d) Herpetic stomatitis
 - (e) Tetanus

3. A new dental nurse joins your practice, but while going through the routine workplace induction process it becomes apparent that she has not received the rubella vaccination. Which one of the following medical conditions would this make her susceptible to?
 - (a) AIDS
 - (b) German measles
 - (c) Hepatitis B
 - (d) Mumps
 - (e) Tetanus

4. The dentist has asked you to change the X-ray processing chemicals in the automatic developer machine. From your induction training, you are aware that the waste chemicals need to be drained from the machine and disposed of in separate labelled containers. Which one of the following waste categories would these fluids be classified as?
 - (a) Domestic waste
 - (b) Hazardous waste
 - (c) Recyclable waste
 - (d) Sharps waste
 - (e) Special waste
5. Modern fire extinguishers are a compulsory requirement in all dental workplaces. They are all coloured red for easy location, and have accompanying coded labels that classify the type of fire for which they can be used. Which one of the following fires can be safely tackled with a water extinguisher?
 - (a) Class A fires
 - (b) Class B fires
 - (c) Class C fires
 - (d) Class D fires
 - (e) Class E fires
6. Under Health and Safety at Work legislation, there are several instances where dental personnel must carry out a risk assessment. In relation to the process of determining the hazards posed by chemicals in use at the surgery, which one of the following describes the third stage of the risk assessment?
 - (a) Control the risk
 - (b) Evaluate the risk
 - (c) Identify how they may be at risk
 - (d) Identify the hazardous chemical
 - (e) Identify who is at risk
7. It is important for all clinically active dental personnel to be vaccinated against a range of infectious diseases before working in the surgery environment. Which one of the following diseases is caused by a blood-borne virus that can be spread by inoculation injuries and bites and which increases the risk of liver cancer in those infected with it?
 - (a) AIDS
 - (b) German measles
 - (c) Hepatitis B
 - (d) Mumps
 - (e) Tetanus
8. An important duty of the dental nurse on a day-to-day basis is to assist in, or manage, the processes in place to avoid microorganism contamination of equipment and instruments. Which one of the following methods is used to kill all microorganisms and spores to produce asepsis?

- (a) Debridement
 - (b) Decontamination
 - (c) Disinfection
 - (d) Social cleaning
 - (e) Sterilisation
9. Accurate record-keeping is an important requirement in the dental workplace, to ensure the health and safety of all dental personnel and patients. While checking the medical history of a new patient, you notice that he has stated that he is HIV positive. Which one of the following medical conditions might this expose you to without the necessary precautions being taken?
- (a) AIDS
 - (b) Creutzfeldt–Jakob disease
 - (c) Hepatitis B
 - (d) Herpetic stomatitis
 - (e) Tetanus
10. To ensure that all persons understand the nature of a chemical's risk to themselves and others, a pictogram system of risk categorisation has been developed and is in widespread use. A circle with flames above on an orange background is the symbol for which one of the following hazards?
- (a) Corrosive
 - (b) Flammable
 - (c) Irritant
 - (d) Oxidising
 - (e) Toxic
11. The term 'indirect cross-infection' is used to refer to the transfer of microorganisms from a contaminated item to another person. Which one of the following techniques avoids indirect cross-infection?
- (a) Decontamination of items
 - (b) Disposable items
 - (c) High-speed aspiration
 - (d) Sterilisation of items
 - (e) Zoning of clinical area
12. In relation to the fire precautions that must be considered for every dental workplace, which one of the following determines whether the premises are at higher risk when assessed for fire safety?
- (a) City centre location
 - (b) Damp cellar
 - (c) Ground floor premises
 - (d) No lift facilities
 - (e) Non-computerised records

13. Many chemicals in normal use throughout dentistry are classed as hazardous. The health effects of some of them can be determined by the use of various health monitoring techniques. Exposure to which one of the following substances can be monitored by urine sampling?
- (a) Mercury
 - (b) Nitrous oxide
 - (c) Phosphoric acid
 - (d) Radiation
 - (e) Sodium hypochlorite
14. While working as a dental nurse on a day-to-day basis, personnel are required to wear various items that are referred to as 'personal protective equipment' (PPE). Which one of the following items of PPE protects the airway from aerosol inhalation?
- (a) Face mask
 - (b) Non-latex clinical gloves
 - (c) Rubber gloves
 - (d) Safety glasses
 - (e) Visor
15. A trainee dental nurse has just commenced employment at your dental practice, while undergoing her necessary training at the local college. Before the trainee can begin to work chair side and start the compilation of their record of experience, she must undergo vaccination against which one of the following blood-borne diseases?
- (a) Diphtheria
 - (b) Hepatitis B
 - (c) Human immunodeficiency virus
 - (d) Rubella
 - (e) Tuberculosis
16. While attending the dental surgery for a routine restorative procedure, a patient trips on the stairs and fractures her right arm. Which one of the following regulations should be followed in relation to determining the cause of the fall?
- (a) COSHH
 - (b) CQC
 - (c) HTM 01-05
 - (d) IR(ME)R
 - (e) RIDDOR
17. Mercury is a liquid metal used in restorative dentistry to form amalgam. It requires careful handling during use as it is toxic to body tissues. Which one of the following methods adequately controls the release of mercury vapour during dental treatment?

- (a) High-speed aspiration
 - (b) Scavenging system
 - (c) Use of capsules
 - (d) Warm surgery
 - (e) Wearing PPE
18. A patient attends the surgery with pain in the lower left quadrant. After the dentist has taken a bitewing radiograph for diagnostic purposes, you are asked to correctly dispose of the film packet. Which one of the following waste options would this item be classified as?
- (a) Confidential waste
 - (b) Domestic waste
 - (c) Hazardous waste
 - (d) Recyclable waste
 - (e) Sharps waste
19. Various regulations and legislation apply to the safe running of dental workplaces. Which one of the following applies to the COSHH regulations?
- (a) Accidents at work
 - (b) Chemicals
 - (c) Fire extinguishers
 - (d) Pressure vessels
 - (e) Radiation hazards
20. Under Health and Safety at Work legislation, there are several instances where dental personnel must carry out a risk assessment. In relation to the process of determining the hazards posed by chemicals in use at the surgery, which one of the following describes the final stage of the risk assessment?
- (a) Control the risk
 - (b) Determine the need for health monitoring
 - (c) Inform all staff
 - (d) Record the risk
 - (e) Review the risk
21. A 12-year-old patient attends the surgery for the extraction of a retained lower deciduous canine tooth. Once the tooth has been extracted, and suitable postoperative instructions given, the dentist asks you to dispose of the tooth accordingly. Which one of the following is the correct method of disposal for the tooth?
- (a) Domestic waste
 - (b) Give to the patient
 - (c) Recyclable waste
 - (d) Sharps waste
 - (e) Special waste

22. A patient attends with a Class II cavity in the lower left first molar tooth. Following restoration of the tooth with an amalgam filling, you are asked to dispose of the used matrix band. Which one of the following waste categories would this item be classified as?
- (a) Domestic waste
 - (b) Hazardous waste
 - (c) Recyclable waste
 - (d) Sharps waste
 - (e) Special waste
23. All dental surgeries have to undergo a fire safety inspection, during which the types and location of various items of fire fighting equipment will be recommended for the premises. Which one of the following is not advised for a dental surgery?
- (a) Carbon dioxide extinguisher
 - (b) Dry powder extinguisher
 - (c) Fire blanket
 - (d) Sand bucket
 - (e) Water bucket
24. Any notifiable incident involving serious injury or a dangerous occurrence is governed by the RIDDOR legislation. All the following events must be reported to the Health and Safety Executive under RIDDOR, except which one of the following?
- (a) Autoclave explosion
 - (b) Fracture of the foot
 - (c) Major mercury spillage
 - (d) Skull fracture
 - (e) Unconsciousness due to hypoxia
25. Various types of waste are produced on dental premises on a daily basis and must be disposed of correctly in accordance with the relevant legislation. Which one of the following is disposed of as special waste?
- (a) Extracted tooth
 - (b) Lead foil
 - (c) Matrix band
 - (d) Used bur
 - (e) Used scalpel blade
26. A patient attends the surgery for the extraction of a grossly carious upper left first molar tooth. The dentist uses a full local anaesthetic cartridge to anaesthetise the tooth and buccal gingiva, and half of a second cartridge to anaesthetise the palatal gingiva. Which one of the following correctly describes the waste category of the second cartridge?

- (a) Domestic waste
 - (b) Hazardous waste
 - (c) Recyclable waste
 - (d) Sharps waste
 - (e) Special waste
27. Under Health and Safety at Work legislation, there are several instances where dental personnel must carry out a risk assessment. In relation to the process of determining the hazards posed by chemicals in use at the surgery, which one of the following describes the second stage of the risk assessment?
- (a) Control the risk
 - (b) Evaluate the risk
 - (c) Identify how they may be at risk
 - (d) Identify the hazardous chemical
 - (e) Identify who is at risk
28. Infection control, sterilisation and decontamination are all key elements of a dental nurse's day-to-day duties, and must be carried out in accordance with the relevant regulations and legislation. Which one of the following is an example of an indirect cross-infection incident?
- (a) Clean inoculation injury
 - (b) Disposal of waste developer
 - (c) Use of decontaminated forceps
 - (d) Use of disposable aspirator
 - (e) Use of new hand file
29. Mercury is a liquid metal used in restorative dentistry to form amalgam. It is toxic to body tissues if inhaled, absorbed or ingested, and requires careful handling if a spillage occurs. Which one of the following is the correct action to take following a small spillage?
- (a) Collect globules into waste pot
 - (b) Collect globules with damp towel
 - (c) Cover spillage with sodium hypochlorite
 - (d) Report to Health and Safety Executive
 - (e) Vacuum area thoroughly
30. To ensure that all persons understand the nature of a chemical's risk to themselves and others, a pictogram system of risk categorisation has been developed and is in widespread use. A skull and crossbones on an orange background is the symbol for which one of the following hazards?
- (a) Corrosive
 - (b) Harmful
 - (c) Irritant
 - (d) Radiation
 - (e) Toxic

31. Various techniques are available within the dental workplace to reduce the risk of cross-infection. Which one of the following methods reduces the risk of cross-infection to zero?
- (a) Use of disposables
 - (b) Use of impermeable barriers
 - (c) Use of vacuum autoclave
 - (d) Use of washer-disinfector
 - (e) Zoning technique
32. Accurate record-keeping is a legal requirement for all dental surgeries, covering many areas of the daily procedures and processes carried out on the premises. A consignment note is one such record. Which one of the following requires a consignment note?
- (a) Autoclave testing
 - (b) COSHH
 - (c) Radiation
 - (d) Waste disposal
 - (e) Waterline contamination
33. Infection control is one of the most important methods for maintaining the safety of all dental personnel in the workplace. The risk of direct cross-infection between staff and patients is greatly reduced by the use of which one of the following infection control methods?
- (a) Barriers
 - (b) Decontamination
 - (c) Lidded trays
 - (d) PPE
 - (e) Sterilisation
34. After a crown preparation procedure has been completed, the dental nurse is disposing of various used items when the local anaesthetic needle pierces her finger. Which one of the following is the first action that should be taken after this injury has occurred?
- (a) Bleed the wound
 - (b) Cover the wound
 - (c) Record in the accident book
 - (d) Report to the dentist
 - (e) Suck the wound
35. Following the surgical extraction of an upper molar tooth, you are tasked with cleaning the surgery before the next patient attends, and discover blood droplets on the dental chair. Which one of the following solutions should you use to clean the chair?
- (a) Aldehyde
 - (b) Chlorhexidine

- (c) Detergent
 - (d) Isopropyl alcohol
 - (e) Sodium hypochlorite
36. To ensure the safe and correct disposal of hazardous waste from the dental workplace, it is categorised depending on the risk it poses to people and the environment. Which one of the following is classed as hazardous waste rather than special waste?
- (a) Empty local anaesthetic cartridges
 - (b) Expired drugs
 - (c) Lead foil
 - (d) Spent processing solutions
 - (e) Used amalgam capsules
37. When preparing reusable dental instruments for sterilisation, the dental nurse must follow the correct procedure to avoid both direct and indirect cross-infection. Which one of the following sequence of events should be followed before sterilisation?
- (a) Débride, inspect, rinse, scrub
 - (b) Débride, scrub, rinse, inspect
 - (c) Rinse, scrub, inspect
 - (d) Scrub, inspect, débride, rinse
 - (e) Scrub, rinse, débride, inspect
38. Mercury poisoning may occur after exposure to small amounts of the chemical over a long period of time, or following inhalation at a major mercury spillage. Which one of the following body organs can be irreparably damaged by mercury?
- (a) Brain
 - (b) Kidney
 - (c) Liver
 - (d) Lung
 - (e) Stomach
39. To ensure the safe and correct disposal of hazardous waste from the dental workplace, various regulations and legislation are in force. Which one of the following states that the dentist is responsible for the safe storage and disposal of hazardous waste?
- (a) Carriage of Dangerous Goods Regulations (2002 update)
 - (b) COSHH regulations
 - (c) Environmental Protection Act 1990
 - (d) Environmental Protection Regulations 1991
 - (e) Health and Safety at Work Act

40. An important duty of the dental nurse on a day-to-day basis is to assist in, or manage, the processes in place to avoid microorganism contamination of equipment and instruments. Which one of the following methods is used to kill bacteria and fungi, but not spores nor some viruses?
- (a) Débridement
 - (b) Decontamination
 - (c) Disinfection
 - (d) Social cleaning
 - (e) Sterilisation
41. Dental instruments that are not categorised as single-use disposable are safe to use again, if they have been sterilised first in an autoclave. The two main types of autoclave in general use in the dental surgery are called vacuum and non-vacuum autoclaves. Which one of the following describes an additional action of the first type over the second type?
- (a) Allows use of perforated trays
 - (b) Reaches 134°C
 - (c) Suitable for hollow instruments
 - (d) Suitable for unwrapped instruments
 - (e) Uses steam
42. When providing oral healthcare to patients, the dental team may sometimes be exposed to dangerous microorganisms. To ensure the safety of all dental personnel at these times, a system of 'standard precautions' is followed. Which one of the following describes this system?
- (a) Check medical histories adequately
 - (b) Refer patient to dental hospital
 - (c) Treat all patients as infectious
 - (d) Treat patient at session end
 - (e) Wear full PPE
43. A key aim during the provision of dental services by members of the dental team is to avoid the transfer of microorganism contamination from one person to another. Which one of the following methods prevents cross-infection from staff to patients?
- (a) Disinfection
 - (b) Hand washing
 - (c) Sterilisation
 - (d) Use of PPE
 - (e) Zoning
44. In the clinical area of a general dental surgery, it is recommended practice to have instruments and equipment directly available for each procedure, and then returned to their storage area after use. Which one of the following is the reason for this action?

- (a) Avoids aerosol contamination
- (b) Avoids clutter
- (c) Easier disinfection of surfaces
- (d) Faster patient turnaround
- (e) Looks tidy

Extended matching questions

Health and safety legislation

For each of the following health and safety scenarios, select the single most appropriate legislation from the options listed. Each option might be used once, more than once, or not at all.

- (a) Clinical governance
- (b) COSHH
- (c) Environmental Protection Act 1990
- (d) Environmental Protection Regulations 1991
- (e) Fire Safety Regulations
- (f) Health and Safety at Work Act
- (g) IR(ME)R
- (h) IRR 99
- (i) RIDDOR

1. The health and safety of all persons while on the premises of the dental workplace is both an employer's and an employee's responsibility, at all times. Many safety issues are simply a matter of common sense and not taking unnecessary risks, but some issues have legislation and regulation in place too. Which one of the options listed is the legislation for ensuring that the ionising radiation exposure of patients is kept to a minimum, for their safety?
2. The provision of dental treatment in the surgery involves the effective use of specialist equipment, instruments and materials. The equipment must be serviced and maintained on a regular basis to ensure its correct operation. Which one of the options listed is the legislation concerned with the explosion of a pressure vessel on the premises?
3. The health and safety of all persons while on the premises of the dental workplace is both an employer's and an employee's responsibility, at all times. Many safety issues are simply a matter of common sense and not taking unnecessary risks, but some issues have legislation and regulation in place too. Which one of the options listed is the legislation which ensures that employees act in a responsible manner while on the premises and do nothing to put themselves, their colleagues or the patients at risk?

4. The instruments and equipment used to provide dental treatment require thorough decontamination and sterilisation methods to be used between patients, to avoid the risk of transferring infection directly or indirectly. Where possible, single-use items are used to eliminate this risk, but otherwise a robust infection control system must be in place for the safety of both patients and staff. Which one of the options listed is concerned with legislation and guidance in infection control?
5. The health and safety of all persons while on the premises of the dental workplace is both an employer's and an employee's responsibility, at all times. Many safety issues are simply a matter of common sense and not taking unnecessary risks, but some issues have legislation and regulation in place too. Which one of the options listed is the legislation which ensures that hazardous waste is stored safely while on the premises, and disposed of correctly?
6. The provision of dental treatment in the surgery involves the effective use of specialist equipment, instruments and materials. Some of the materials used can be harmful to both patients and staff if they are handled or stored incorrectly. Which one of the options listed is the legislation that provides guidance on the health hazards associated with these materials?

Answers

Multiple choice questions

1. *Correct answer: d.* The normal working parameters of a steam autoclave are 134°C for 3 minutes at a pressure of 2.2 bar (32 pounds per square inch or 220 kPa). This is the holding temperature required for this length of time and at this pressure to achieve sterilisation of the autoclave contents.
2. *Correct answer: b.* *Clostridium* is an intestinal bacterium that can be transferred by poor personal hygiene measures, particularly after using the toilet. None of the other options listed are conditions or organisms that are known to be transmitted in this way.
3. *Correct answer: b.* Vaccination against German measles is usually administered in childhood as part of the MMR vaccine, although it is possible to receive the rubella vaccine separately.
4. *Correct answer: e.* Both the developer and fixer solutions are considered as special waste, as they give off powerful fumes that can be inhaled and which irritate the respiratory system. They require separate storage as waste products, and must be disposed of in an environmentally friendly manner by specialist waste contractors. They cannot be disposed of on the surgery premises.
5. *Correct answer: a.* Class A fires are those caused by carbon-containing items, such as paper, wood and textiles, and can be safely doused with water extinguishers. The other options listed involve fires caused by flammable liquids or gases, reactive metals or electrical components and should not be tackled with water extinguishers.
6. *Correct answer: c.* A risk assessment should be carried out in the following order: identify the risk, identify who is at risk, identify how they may be at risk, evaluate the possible risk, then control the risk.
7. *Correct answer: c.* Hepatitis B is a virulent blood-borne viral infection that can be transmitted from inoculation injury or insect bites. All clinical dental personal must be vaccinated against it, or be immune to it, before working at the chair side.
8. *Correct answer: e.* This is the definition of sterilisation, the only option listed where all microorganisms and spores are killed to produce asepsis. Sterilisation methods usually involve the use of an autoclave, a device that uses steam under pressure or in a vacuum to kill microorganisms and their spores.
9. *Correct answer: a.* Human immunodeficiency virus (HIV) is the infective microorganism that causes the fatal disease acquired immunodeficiency syndrome (AIDS). HIV is a blood-borne virus and therefore of great concern to all clinical dental personnel, as there is no vaccination against it nor curative treatment once contracted.

10. *Correct answer: d.* These are any chemicals classed as a health and safety risk because they oxidise in air, i.e. they can spontaneously burst into flames when they are exposed to, and react with, oxygen in normal air. The black circle ringed above with flames is the recognised symbol for these agents.
11. *Correct answer: b.* Indirect cross-infection occurs when an infected person contaminates a piece of equipment or an instrument, which is then used on another person while still contaminated from the first person. However, if items are used once and then safely disposed of (classed as single use or disposable), then there can be no transfer of contamination between persons. The use of disposable items therefore guarantees that indirect cross-infection cannot occur. The sterilisation of items can only be guaranteed to prevent indirect cross-infection if the correct preparation and techniques have been followed.
12. *Correct answer: e.* If records are not computerised, then they must be stored as hard copies in paper or a similar format. As most dental workplaces have several thousand patients, as well as all the additional record items such as medical history forms and laboratory slips for each patient, this will be a considerable amount of potentially combustible paper on the premises. None of the other options listed would define the premises as a high fire risk.
13. *Correct answer: a.* Mercury is present in amalgam, and can be a potential hazard for all dental personnel if used inappropriately. It can be absorbed, inhaled or ingested into the body and can be detected by urine testing. Radiation exposure can be detected using monitoring badges, nitrous oxide exposure is monitored using room sensors, and the other options listed are chemicals that require no monitoring.
14. *Correct answer: a.* When worn correctly across the mouth and nose, good-quality face masks should prevent inhalation of aerosol contamination that has been produced during routine dental procedures in the surgery environment. Visors are clear screens worn in front of the full face that prevent splatter contamination, but they do not prevent inhalation of aerosols as the wearer's mouth and nose are not closely covered.
15. *Correct answer: b.* Vaccination against hepatitis B is a specific health and safety requirement for all clinical dental personnel, and proof of immunity is a clinical governance requirement. Human immunodeficiency virus cannot be vaccinated against, and the other options listed are given to the whole population routinely during childhood vaccination programmes.
16. *Correct answer: e.* The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) deal specifically with categorised serious injuries that occur in the workplace, such as a fractured limb. COSHH deals with the risk assessment and management of chemicals, CQC is an organisation concerned with workplace registration, HTM 01-05 is concerned with infection control procedures, and IR(ME)R deals with ionising radiation regulations.

17. *Correct answer: a.* High-speed aspiration will suck away any mercury vapours during amalgam removal or placement so that they are not inhaled by dental staff or the patient. Scavenging is a safety system used during inhalation sedation techniques, where nitrous oxide fumes are safely removed from the clinical area. None of the other options listed will control the release of mercury vapour.
18. *Correct answer: c.* The film packet has been in the patient's mouth and will be contaminated by saliva. It is therefore classed as hazardous waste (or what used to be termed 'clinical' waste) and will be correctly disposed of by incineration. As the packet poses no inoculation injury threat, it is not classed as sharps waste, and disposal of the other waste options listed may not be by incineration and therefore are not relevant.
19. *Correct answer: b.* The Control of Substances Hazardous to Health (COSHH) regulations provide an easy to use method of risk assessing chemicals used in the workplace, and provide advice on their safe management and avoidance of injury.
20. *Correct answer: e.* All the other options listed are the stages that should have been gone through in the initial risk assessment procedure to determine whether the chemical was hazardous in the first place. Once the risk assessment has been completed and the findings recorded, it will be reviewed on a regular basis to determine if the risk has increased or not, and if the risk is being adequately managed or not.
21. *Correct answer: d.* As the tooth is a canine, it is unlikely to have an amalgam filling and will therefore not be classed as special waste. However, it is a potentially contaminated body part and must be treated as hazardous, so the tooth should be disposed of as sharps waste. It is currently considered unacceptable to give extracted teeth to the patient, and the other options listed are unsuitable.
22. *Correct answer: d.* A used matrix band is a contaminated item, having been in the patient's mouth, as well as having the potential to cause injury by cutting the finger during removal from the retainer. It therefore can only be classed as sharps waste.
23. *Correct answer: e.* Dental surgeries contain many items of specialised electrical equipment, over and above routine work items such as computers and the like. To use water to douse flames in this environment would be totally inappropriate, as well as very dangerous, as patients and staff could be electrocuted. Any of the other options listed are suitable alternative fire fighting equipment.
24. *Correct answer: b.* Injuries that require reporting under RIDDOR are categorised as major, while others are categorised as minor and do not require

reporting. Fracture of the foot is considered a minor injury, as there is little treatment that can be offered to assist the healing that will occur naturally. Casts and splints are not required because the bones of the foot do not tend to be displaced. All the other options listed are injuries or events that must be reported under RIDDOR.

25. *Correct answer: b.* Lead is a toxic substance that can be absorbed through the skin or ingested to cause poisoning, and in severe cases this can be fatal. It must therefore not be disposed of in a manner that would harm other persons or the environment, nor can it be incinerated as toxic fumes would be produced. Hence it is categorised as special waste, requiring a special method of disposal. All the other options listed should be disposed of as sharps waste.
26. *Correct answer: e.* The contents of the local anaesthetic cartridge are classed as a medical drug, and must therefore be disposed of as such if not fully discharged during use. The unused contents must not be ejected into the workplace drainage system (i.e. sink or toilet) for the same reason. Again, they are classed as special waste and require special disposal.
27. *Correct answer: e.* A risk assessment should be carried out in the following order: identify the risk, identify who is at risk, identify how they may be at risk, evaluate the possible risk, then control the risk.
28. *Correct answer: c.* Decontaminated forceps will have had particulate debris removed from them, either in an ultrasonic bath or a washer-disinfector, but they will not be sterile. Microorganisms may still be present on the blades and could cross-infect the next patient who undergoes an extraction procedure. A clean inoculation injury involves a needle or other sharp instrument that is sterile, so it will not cause indirect cross-infection.
29. *Correct answer: a.* Amalgam waste pots contain a sponge impregnated with chemicals that prevent the release of mercury vapour into the atmosphere, and all unused and waste amalgam and mercury should be stored in them. The Health and Safety Executive are only notified when a large mercury spillage occurs (too large for the workplace to manage safely), and vacuuming the mercury will release the vapours into the atmosphere more readily still. Damp paper towels should only be used on spillages that have been treated with the chemicals from the mercury spillage kit first. Sodium hypochlorite has no effect on mercury.
30. *Correct answer: e.* A risk categorisation of 'toxic' indicates that the chemical can cause damage to health even at low levels, and is therefore particularly dangerous. An example is mercury liquid.
31. *Correct answer: a.* The single use of pre-sterilised new items on one patient, followed by their safe removal and disposal as hazardous waste, ensures that any contamination from one patient is not transferred to another nor to

dental personnel. All the other options listed are methods used to reduce the risk of cross-infection, but not to zero.

32. *Correct answer: d.* Consignment notes are issued by specially licensed waste disposal companies to any premises where they are contracted to collect and dispose of hazardous or special waste. This includes dental workplaces, whose duty it is to ensure that waste is stored safely and disposed of correctly. Both parties must sign and keep copies of the consignment notes for up to 3 years, with details and identification tag numbers of each consignment listed on them.
33. *Correct answer: d.* Personal protective equipment (PPE) are items such as face masks, gloves, safety glasses and visors, which all clinical team members must wear when working at the chair side. They prevent direct contact between the patient and the dental personnel, thereby preventing direct cross-infection between the two parties in either direction – from staff to patient or from patient to staff.
34. *Correct answer: a.* The wound should be squeezed to bleed it immediately so that any microorganisms that have been inoculated into the finger are prevented from entering the circulation in large numbers. The squeezed out blood should be allowed to drip into the sink and flushed away as the wound is held under running water. The wound can then be covered, the dentist informed and the incident reported in the accident book. The wound should never be sucked.
35. *Correct answer: e.* A strong solution of fresh sodium hypochlorite (bleach) is the correct product to use for all blood spillages initially, followed by drying and then wiping of the area with any of the other products listed.
36. *Correct answer: a.* Empty local anaesthetic cartridges pose a hazard because they can be broken and thus cause a sharps injury to either the dental personnel or to the waste disposal personnel. They should be stored in a sharps bin and are therefore categorised as hazardous waste and disposed of by incineration. All the other options listed are examples of special waste items that require special disposal techniques other than incineration.
37. *Correct answer: a.* Debridement is performed by placing the items into either an ultrasonic bath or a washer-disinfector for the correct time period and using the correct chemicals. This renders the items safe to be handled while wearing clean PPE, so that they can be visually inspected for residual contamination, rinsed and then manually scrubbed before being autoclaved.
38. *Correct answer: b.* The kidneys are excretory organs that filter drugs from the circulatory system, before removing them from the body in the urine. If relatively large amounts of mercury have to be removed, or small amounts over a long time, the kidney tissues gradually become permanently damaged until

the organs go into failure. Kidney failure is the final stage of mercury poisoning before death occurs.

39. *Correct answer: c.* This Act places a duty of care on the dentist to ensure that all hazardous waste produced on the premises is stored safely and securely, and to arrange for its correct disposal by a registered waste collector. Any breaches of the Act (such as dumping of hazardous waste by fly tipping) are likely to result in prosecution. The Environmental Protection Regulations state that the hazardous waste collector must be registered, and must issue transfer and consignment notes as required.
40. *Correct answer: c.* This is the definition of the process of disinfection, and usually involves the use of chemicals called bactericides, fungicides and viricides. Debridement and decontamination involve the removal of particulate contaminated debris, sterilisation kills all microorganisms and their spores, and social cleaning is that level acceptable in non-clinical areas.
41. *Correct answer: c.* Narrow-bore hollow instruments may harbour residual microorganisms that are viable, and could therefore cause cross-infection if the steam from a non-vacuum autoclave fails to penetrate the lumen entirely. No life forms can exist in a vacuum, including microorganisms, so the formation of a vacuum during the sterilisation process in a vacuum autoclave ensures that all microorganisms are killed, even within hollow instruments. All the other options listed apply to both types of autoclave.
42. *Correct answer: c.* The only safe approach when treating patients in the dental workplace is to assume that everyone is potentially infectious, so they should be managed and treated as if they were a disease carrier. PPE must always be worn (even for friends and family), infection control procedures must always be followed, and the dental team must never put themselves at risk of cross-infection from any patient by failing to follow the correct procedures. Standard precautions used to be referred to as 'universal precautions'.
43. *Correct answer: b.* Thorough hand washing is the single most important method of preventing cross-infection from staff to patients, and this applies in every medical and dental workplace. Normal daily activities can contaminate the hands with many microorganisms, in addition to those commensal microorganisms normally present on the skin. Any of these can cause cross-infection by being passed on to a patient. PPE should only be worn in the clinical area, and the other options listed prevent cross-infection in the opposite direction (from patient to staff).
44. *Correct answer: a.* The use of handpieces or ultrasonic scaling units will create an aerosol in any dental environment, the majority of which should be removed by high-speed aspiration by the dental nurse. Some aerosol contamination will still occur though, and this will eventually settle on the surgery work surfaces within the clinical area. Any equipment and instruments on these surfaces will then also become contaminated.

Extended matching questions

Health and safety legislation

1. *Correct answer: g.* The regulations and legislation in place under IR(ME)R ensures that the actions of all staff with regard to ionising radiation exposure of patients is aimed towards the principals of ALARP (as low as reasonably practicable). The use of quality assurance programmes to reduce re-exposures and the use of fast-speed intra-oral films are some of the examples used to achieve this principle.
2. *Correct answer: i.* An event such as this would be classed as a dangerous occurrence in the workplace, and its investigation and future prevention is covered under RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations).
3. *Correct answer: f.* The Health and Safety at Work Act clearly states that employees have a duty to behave in an appropriate manner while in the workplace, doing nothing to put themselves or anyone else at risk, and following the health and safety rules of their employer at all times. The Act also stipulates the actions that the employer must take to abide by it too.
4. *Correct answer: a.* The obligation that overall infection control procedures be in place in the dental workplace is a requirement of clinical governance guidelines. The actual specifics of the procedures themselves vary in different parts of the UK, but are currently mainly covered in England by the HTM 01–05 publication from the Department of Health.
5. *Correct answer: c.* This Act clearly states that the duty of care is on the dentist to store all hazardous waste safely and securely on the premises, and to arrange for its correct disposal by incineration. The Environmental Protection Regulations are concerned with the responsibilities of the waste collector.
6. *Correct answer: b.* The Control of Substances Hazardous to Health (COSHH) is a risk assessment system to identify any potentially harmful chemicals or materials used on the premises, and how to safely manage and handle them if they must be used. First aid information in the event of an accident must also be recorded and kept in the COSHH file.

13 Teamwork

Multiple choice questions

1. A key aspect in the successful working of the dental team is for the majority of patients to be seen by a dentist for a full mouth assessment first, before possibly referring to another team member. Which one of the following treatments can be provided without the input of a dentist first?
 - (a) Cementing of a bridge
 - (b) Extraction of a deciduous tooth
 - (c) Placement of a temporary filling
 - (d) Provision of full dentures
 - (e) Taking of a radiograph
2. A father has brought his 14-year-old son to the surgery for a dental examination, expressing concern that the teenager's upper canine teeth have still not erupted. Which one of the following radiographs would you lay out for the dentist to use?
 - (a) Bitewing
 - (b) Dental pantomograph
 - (c) Lateral oblique
 - (d) Occlusal
 - (e) Periapical
3. Under the 'Scope of Practice' document produced by the General Dental Council (GDC), dental nurses may be able to carry out additional duties under certain circumstances. Under which one of the following circumstances would such additional duties be acceptable?
 - (a) During a short-staff period
 - (b) During a dental emergency
 - (c) Following competency training
 - (d) Instructed by employer
 - (e) Instructed by senior staff member

4. A key part of the dental nurse's chairside role is to accurately record the dictated clinical findings during an oral health assessment. Which one of the following is information not recorded by the dental nurse?
 - (a) BPE score
 - (b) PAR score
 - (c) Required recall interval
 - (d) Soft tissue details
 - (e) Tooth charting
5. A patient has arrived for the restoration of the carious lower left second molar tooth using amalgam, and the dentist has asked you to set up the surgery for the procedure. Which one of the following items would you lay out for the dentist to use?
 - (a) Acetate matrix strip
 - (b) Air turbine handpiece
 - (c) Briault probe
 - (d) Lateral condenser
 - (e) Tapered diamond bur
6. When any member of the dental team is providing care for a patient, it is always advisable for a second GDC registered team member to be present. In which one of the following circumstances may this not be possible?
 - (a) During a sedation session
 - (b) Out-of-hours emergency
 - (c) When short staffed
 - (d) When treating adults
 - (e) When treating children
7. Before taking an impression of a tooth which has been prepared for a crown, the dentist may need to ensure that the preparation margins are clearly visible. Which one of the following items should you anticipate that the dentist will require for this purpose?
 - (a) Crown form
 - (b) Dam clamp
 - (c) Matrix band
 - (d) Retraction cord
 - (e) Wooden wedge
8. All members of the dental team are expected to work together in the best interests of the patient at all times. Which one of the following documents provides guidance for all members to achieve this aim?
 - (a) CQC Regulations
 - (b) Developing the Dental Team
 - (c) GDC Standards
 - (d) Local Rules
 - (e) The First Five Years

9. The dentist is carrying out root canal therapy on the upper left second premolar tooth. All the caries has been removed and the dentist now needs to gain access to the root canal. Which one of the following items should you anticipate that the dentist will require?
 - (a) Barbed broach
 - (b) Finger spreader
 - (c) Gates Glidden drill
 - (d) Hand file
 - (e) Rotary paste filler
10. A newly qualified and registered dental nurse begins work at your dental surgery, and is appointed as your mentor during your training towards qualification. You are then asked to carry out tasks for which you have received no training. Which one of the following is responsible for your possible errors while carrying out these tasks?
 - (a) General Dental Council
 - (b) National Health Service
 - (c) Your employer
 - (d) Your mentor
 - (e) Yourself
11. Throughout their dental career, all dental personnel are required to act in the best interests of the patient. Unfortunately, a small minority of dental team members fail to follow this requirement at all times. Before statutory registration of DCPs began, only the dentist would have been held responsible for these failures. Which one of the following terms best describes this fact?
 - (a) Breach of confidentiality
 - (b) Indemnity
 - (c) Omission
 - (d) Valid consent
 - (e) Vicarious liability
12. Patients have a right to expect that their dental records remain confidential to the dental surgery and that information is not released to a third party without their permission. The dental team are legally obliged to comply with this requirement, under all except which one of the following regulations?
 - (a) Access to Health Records
 - (b) Amendment Order 2005
 - (c) Caldicott Regulations
 - (d) Data Protection Act 1998
 - (e) Freedom of Information Act
13. At the fit stage of denture construction, the patient will attend for the final insertion of the completed dentures and be given advice on care and wear

instructions. Which one of the following items would you anticipate the dentist to require at this stage of denture construction?

- (a) Articulator
 - (b) Carborundum stone
 - (c) Gas burner
 - (d) Mixing spatula
 - (e) Plaster knife
14. The dentist is completing root canal therapy on the lower right lateral incisor tooth. You have mixed a suitable root filling material. Which one of the following items should you anticipate that the dentist will require so that the material can be inserted into the canal?
- (a) Barbed broach
 - (b) Finger spreader
 - (c) Gates Glidden drill
 - (d) Hand file
 - (e) Rotary paste filler
15. If a dental nurse believes that another team member's actions may put a patient at risk, he or she has a duty to raise a concern. Which one of the following GDC Standards key principles does this relate to?
- (a) Be trustworthy
 - (b) Cooperate with other team members
 - (c) Protect patient confidentiality
 - (d) Put patients' interests first
 - (e) Respect patients' dignity and choices
16. A 50-year-old patient attends the surgery for an apicectomy procedure on the upper left central incisor. Once local anaesthesia has been applied and taken effect, the dentist will need to gain access to the root apex to carry out the procedure. Which one of the following instruments should you anticipate that the dentist will use to raise the mucoperiosteal flap?
- (a) Bone rongeurs
 - (b) Periosteal elevator
 - (c) Scalpel outfit
 - (d) Tissue dissecting forceps
 - (e) Tissue rake
17. When a dental nurse has raised a concern about a serious matter, he or she is protected from retaliation in some circumstances under the Public Interest Disclosure Act 1998. Which one of the following circumstances describes where this protection will not apply?
- (a) Acting in good faith
 - (b) Allegation involves a crime
 - (c) Believe the allegation to be true

- (d) Will gain personally from the outcome
 - (e) Working outside the NHS
18. An elderly patient attends the surgery for an alveolectomy procedure of the lower alveolar ridge. Once a periosteal flap has been raised, the dentist will carry out the removal of any sharp spicules of bone, so that any future denture can be worn comfortably. Which one of the following instruments should you anticipate that the dentist will use for this procedure?
- (a) Austin retractor
 - (b) Bone rongeurs
 - (c) Coupland's chisel
 - (d) Periosteal elevator
 - (e) Tissue dissecting forceps
19. When various members of the dental team are required to communicate with patients, it is important that they all give the same message so that the patient does not become confused. Which one of the following methods is used to achieve this?
- (a) Check on the internet
 - (b) Copy what the dentist says
 - (c) Have a written protocol
 - (d) Learn the message by rote
 - (e) Refer to a textbook
20. During the restoration of a particularly deep cavity in the upper left first premolar tooth, the dentist must carefully remove the caries overlying the pulp chamber, without causing an exposure. Which one of the following instruments should you anticipate that the dentist will require?
- (a) Ball-ended burnisher
 - (b) Enamel chisel
 - (c) Flat plastic instrument
 - (d) Friction grip diamond fissure bur
 - (e) Spoon excavator
21. Patients are entitled to expect that the dental team will keep any information held about them confidential – this is called the duty of confidentiality. Which one of the following is the exception to this duty?
- (a) Information learned anonymously
 - (b) Information learned from a team member
 - (c) Information learned from another patient
 - (d) Information learned outside professional role
 - (e) Information learned verbally
22. When a tooth has been traumatised or attacked by cariogenic bacteria, it often results in the condition of irreversible pulpitis if left untreated. In which

one of the following treatments would the dentist ask for your assistance in order to save the tooth?

- (a) Apicectomy
 - (b) Open apex root filling
 - (c) Pulp capping
 - (d) Pulpotomy
 - (e) Pulpotomy
23. In some situations, a dental nurse may be unsure whether a colleague's actions or omissions are serious enough to raise a concern. Which one of the following bodies specifically provides confidential advice on these types of issue?
- (a) Business Services Authority
 - (b) Care Quality Commission
 - (c) Health and Safety Executive
 - (d) Healthcare Commission
 - (e) Public Concern at Work
24. During denture construction, the patient will attend for a trial insertion stage of the dentures, with the teeth set up in wax rims. Which one of the following instruments would you anticipate that the dentist will need for fine wax adjustment at this stage?
- (a) Articulator
 - (b) Fox's plane
 - (c) Le Cron carver
 - (d) Plaster knife
 - (e) Wax knife
25. Patients are often given verbal oral health advice by a member of the dental team, often at the end of an appointment. Which one of the following is the preferred method of reinforcing that advice, so that the patient remembers it?
- (a) Ask a colleague to reiterate it
 - (b) Ask the dentist to reiterate it
 - (c) Give in written form
 - (d) Repeat verbally at the next appointment
 - (e) Repeat verbally at the time
26. A patient attends the surgery for the extraction of a grossly carious lower left third molar tooth. On examination, the dentist anticipates that the procedure will require a surgical approach, and is likely to use various instruments throughout the procedure. Which one of the following instruments would you be using during the procedure while working at the chair side?
- (a) Austin retractor
 - (b) Coupland's chisel
 - (c) Periosteal elevator
 - (d) Tissue dissecting forceps
 - (e) Warwick James' elevator

27. In some situations, a patient's oral healthcare may be delivered by several members of the dental team, in separate treatment sessions. Which one of the following is the information that will not be required by all team members?
 - (a) Cost of treatment
 - (b) Members involved
 - (c) Order of treatment
 - (d) Treatment plan
 - (e) Updated clinical notes
28. From time to time, patients may feel that they have received a less than adequate service from their dental surgery, and make a complaint. In order to handle the complaint correctly, the dental team must carry out which one of the following?
 - (a) Accept liability
 - (b) Acknowledge receipt within the week
 - (c) Apologise unreservedly
 - (d) Provide details of the staff member involved
 - (e) Report back to the patient within 10 days
29. Following the successful amputation of the root apex of a lower lateral incisor tooth, the dentist starts to remove the remaining infected debris from the surgical site. Which one of the following instruments should you anticipate that the dentist will use for this task?
 - (a) Austin retractor
 - (b) Bone rongeurs
 - (c) Mitchell's trimmer
 - (d) Periosteal elevator
 - (e) Tissue dissecting forceps
30. When patients attend the dental surgery for treatment, they must be given certain information by the dental team before they can decide if they wish to proceed with the treatment. This is termed valid consent. Which one of the following is not necessary for consent to be valid?
 - (a) Agreed in writing
 - (b) Detail all costs
 - (c) Give full information
 - (d) Given voluntarily
 - (e) Specific to the treatment
31. Under the GDC 'Scope of Practice' publication, the dental nurse may carry out additional duties after receiving suitable training for them. This training is often given on the dental premises and by a work colleague, with written records kept as evidence of the training received. Which one of the following tasks requires both assessment and qualification before the dental nurse can carry it out?
 - (a) Assist in special waste disposal
 - (b) Change processing solutions

- (c) Expose films
 - (d) Process films
 - (e) Run a quality assurance programme
32. Once dental nurses become qualified and registered, they may choose to change jobs and work for a new employer. Of the legal documents they hold, which one of the following should be made available to the general public?
- (a) CRB determination
 - (b) Driving licence
 - (c) GDC registration
 - (d) Qualification certificate
 - (e) Vaccination record
33. Under normal circumstances, only members of the dental team are legally allowed to carry out dental procedures or assist during these procedures. Which one of the following is the exception to this, involving registered general nurses?
- (a) Intravenous sedation
 - (b) Maxillofacial surgery
 - (c) Orthodontic treatment
 - (d) Provision of dentures
 - (e) Simple extractions
34. When delivering dental health advice to a patient, the dental team needs to be aware of various issues that may affect the motivation or ability of the patient to follow the advice. Which one of the following is most likely to affect the ability of the patient to carry out adequate plaque control?
- (a) Age
 - (b) Learning disability
 - (c) Medication
 - (d) Physical disability
 - (e) Socioeconomic status
35. Good communication skills by the dental team are of great importance in encouraging patients to take an active role in managing their own oral health. Which one of the following indicates that you are interested in what the patient is saying?
- (a) Breaking eye contact
 - (b) Folding the arms
 - (c) Leaning towards them
 - (d) Reapplying your PPE
 - (e) Standing up

Answers

Multiple choice questions

1. *Correct answer: d.* The provision of full dentures to a patient can be carried out by qualified and GDC registered clinical dental technicians, without the input of a dentist beforehand. All the other options listed (except cementing of a bridge) require assessment by a dentist first, and then referral by the dentist to a suitably qualified and GDC registered dental care professional.
2. *Correct answer: d.* As both canine teeth are absent after their normal eruption range of 10–12 years, an upper occlusal radiograph will show the presence or absence of one or both teeth after a single exposure. Two periapical views would be required as an alternative, which would double the patient's X-ray exposure. A dental pantomograph would require a significantly higher X-ray exposure and produce a much greater field of exposure than required. The other two options listed are unsuitable for this purpose.
3. *Correct answer: c.* Under the GDC 'Scope of Practice' publication, the dental nurse may carry out additional duties after receiving suitable training for them. This training may be given on a course, or on the dental premises by a work colleague. In either case, written records must be kept of the training received and that the dental nurse is deemed to be competent in the additional duties by the person who provided the training.
4. *Correct answer: b.* PAR scoring is carried out on the preoperative and postoperative study models of orthodontic patients in order to determine the level of success of the treatment provided. It is usually carried out by trained laboratory technicians, and there should be a significant drop in the postoperative PAR score from the preoperative PAR score if the treatment has been successful. All the other options listed are clinical findings that are routinely recorded by the dental nurse during an oral health assessment.
5. *Correct answer: b.* The cavity in the tooth will require drilling first, to remove caries and shape the cavity accordingly for the placement of the filling. The dentist will require the air turbine handpiece for this procedure, but none of the other options listed would be required.
6. *Correct answer: b.* This is the only scenario from the options listed where it is acceptable for a dental team member to be working alone. However, even under these circumstances, the dental team member is expected to take responsibility for assessing the possible risk to the patient of continuing with treatment in the absence of another team member. This is covered in the GDC document 'Principles of Dental Team Working' under item 3, which covers individual responsibilities within the team.

7. *Correct answer: d.* Gingival retraction cord is similar to a piece of thin string which has been soaked in an astringent such as adrenaline. When placed into the gingival crevice around the prepared tooth, the astringent causes the immediate tissues to shrink away from the tooth, so that a small gutter is created. The cord is removed immediately before the impression is taken, so that the impression material can run into this gutter and accurately record the margins of the preparation. None of the other options listed are suitable for this purpose.
8. *Correct answer: c.* In the GDC publication 'Standards for Dental Professionals', this principle is referred to several times: under item 1 'Put patients' interests first and act to protect them' and under item 4 'Cooperate with other members of the dental team and other healthcare colleagues in the interests of the patient'. The GDC documents 'Developing the Dental Team' and 'The First Five Years' set out the competencies expected of newly qualified DCPs and newly qualified dentists, respectively.
9. *Correct answer: c.* Gates Glidden drills are available in a range of sizes and can be used to drill through the pulp chamber floor and gain initial access to the root canals. The barbed broach is used to extirpate the pulp contents, the hand file to shape and contour the canals, and the finger spreader and rotary paste filler are used while placing the root filling.
10. *Correct answer: d.* Now that all GDC registrants are responsible for their own acts and omissions during the provision of dental care to patients, the team member who is in direct charge of the trainee dental nurse will be liable for the trainee's possible errors. In this case, it is the mentor. The trainee dental nurse is not directly responsible as he or she is not a GDC registrant yet. The employer is not responsible as he or she has personally not asked the trainee dental nurse to carry out the tasks without suitable training.
11. *Correct answer: e.* This was the term used to describe the employing dentist's sole responsibility for the actions or omissions of all their staff, before statutory registration of all dental care professionals began. Although the employer is still responsible for ensuring that all staff are trained in the correct workplace protocols and procedures, so that mistakes do not happen, the staff now also have a responsibility to act in accordance with the principles laid down in the GDC document 'Standards for Dental Professionals'. Failure to do so by their own choice renders staff members liable now.
12. *Correct answer: b.* The Amendment Order 2005 is additional legislation that concerns the legal responsibilities of all dental care professionals, over and above that laid down in the Dentists Act 1984 concerning dentists. The Amendment Order is not directly relevant to the issue of patient confidentiality, unlike all the other options listed which are relevant.
13. *Correct answer: b.* A carborundum stone is used to remove high spots on the teeth of the completed denture, as an alternative to an acrylic trimming bur. The stone removes excess material more gently than the stainless steel

bur, but adjusted areas should always be polished smooth once any necessary adjustments have been completed. All the other options listed are items required for earlier stages of denture construction, but not for the fit stage.

14. *Correct answer: e.* The rotary paste filler is used with the slow handpiece and it is smeared through the mixed sealant material so that a layer is collected onto it. Once in place at the canal entrance, the handpiece is operated as the paste filler rotates and is partially inserted gently into the top of the canal. The collected sealant material will spin off the instrument into the canal, coating the walls and preparing the canal for the insertion of the gutta percha points. All the other options listed are endodontic instruments, but are not suitable for this stage of the procedure.
15. *Correct answer: d.* This is covered under key principle 1 of the GDC document 'Standards for Dental Professionals' – 'Put patients' interests first and act to protect them'. All dental professionals have a duty of care to patients to raise concerns under these circumstances.
16. *Correct answer: b.* The scalpel outfit (the blade and knife handle) will be used to cut through the mucoperiosteum and produce the flap of tissue, but the flap itself will be raised off the underlying bone using the periosteal elevator. None of the other options listed are instruments capable of carrying out this part of the procedure.
17. *Correct answer: d.* This is covered under item 4 of the GDC standards guidance 'Principles of Raising Concerns', which gives advice on the protection available for people who raise concerns, under the Public Interest Disclosure Act 1998. This clearly states that anyone who raises a concern must not do so if he or she intends to make a personal gain by doing so. An example may be when an act of whistleblowing results in the sacking of one person, and the whistleblower intends to be promoted into the job vacancy created.
18. *Correct answer: b.* Bone rongeurs are used to nibble away any sharp bony projections on the top of the alveolar ridge, so that a smooth surface is produced that will allow future dentures to sit comfortably. A bone drill or a bone file may also be used to the same effect. None of the other options listed are instruments that would be suitable for this purpose.
19. *Correct answer: c.* Written protocols do not have to be learned and repeated from memory, but are always available to be referred to at the time of talking to the patient. As they are written down, their content will not change from one patient or appointment to the next, so the same message is consistently being provided by the dental team at all times. In addition, because protocols have been developed and produced by the dental team together, they will also give information that has been accepted and agreed upon by all team members.
20. *Correct answer: e.* The use of hand instruments at this point allows the dentist to have a much greater level of tactile sensation than is possible using handpieces and burs, so that the softened dentine can be removed in tiny

amounts without exposing the pulp chamber beneath. None of the three other hand instrument options listed are suitable for this purpose.

21. *Correct answer: d.* The duty of confidentiality specifically applies to all information about the patient which members of the dental team learn, or become aware of, in their professional role. Information learned outside of their professional role is not applicable. All the other options listed are applicable to the duty of confidentiality, as set out in the GDC document 'Principles of Patient Confidentiality'.
22. *Correct answer: d.* Pulpectomy is the correct term for root canal therapy, i.e. the complete removal of the pulp contents from the tooth, before a root filling is placed. Pulpotomy is the term used when the pulp contents are removed from the pulp chamber only, and not the canal. Open apex root filling is carried out on immature permanent teeth to encourage the closure of the apical foramen, so that a conventional root filling can be placed at a later date. Pulp capping is the sealing of a pinpoint pulp exposure to maintain the vitality of the tooth, and apicectomy is the surgical amputation of the apex of a root.
23. *Correct answer: e.* The GDC Standards document providing guidance on the 'Principles of Raising Concerns' clearly states that one of the organisations that will give independent advice on these types of issues is the authority Public Concern at Work. Their advice is confidential and free.
24. *Correct answer: c.* Either the Le Cron carver or the wax knife is used for the adjustment of the wax component of the trial denture, but for fine adjustment the smaller blade of the former is far superior to the bulky wax knife. The plaster knife is used to trim excess plaster from cast models. The other two options listed are not suitable items for wax adjustment.
25. *Correct answer: c.* Unless the advice is given both verbally and in written format, patients must rely on memory to remember the key points given. Providing patient information leaflets on various oral health topics is a key method used by the dental team to ensure that important health advice is remembered and acted upon by patients after they have left the surgery. Recall of the points made is far higher using this technique than if advice is just provided verbally, no matter how many times it is repeated and by how many team members.
26. *Correct answer: a.* One of the dental nurse's main roles during chairside procedures is to safely retract various soft tissues around the oral cavity. This helps the dentist to see more clearly while carrying out a procedure, and is one less task for the dentist to have to perform. The Austin retractor is specifically used for the effective retraction of the cheek tissues. The dental nurse would not use any of the other options listed.
27. *Correct answer: a.* All the other options listed are points of crucial information that all members of the dental team will require, if the treatment

is to be carried out fully and satisfactorily. The cost of the treatment is only of real relevance to the team member who will receive payment for it, during treatment or upon its completion.

28. *Correct answer: e.* When a patient makes a complaint, the practice must have a set procedure in place to deal with it sensitively – it cannot be ignored. Receipt of the complaint must be given within two working days, but details of the staff member involved must not be released. Until the investigation is complete, liability should not be accepted by the practice, nor should an unreserved apology be given. However, a written investigation report should be sent to the patient within 10 working days of receipt of the complaint.
29. *Correct answer: c.* This is a surgical instrument with a spoon-shaped end that is ideal for scooping out any remaining pathological debris from the surgical site during this procedure. None of the other options listed are suitable instruments for this task.
30. *Correct answer: a.* While it is considered best practice for all treatment courses to be agreed in writing, it is not necessary to do so in every case and is therefore not a requirement for consent to be valid. Ideally, all extensive, complicated and expensive courses of treatment should be covered by a written agreement, as should any course involving sedation techniques. In all cases, the patient must be issued with a written and itemised estimate of the proposed treatment plan.
31. *Correct answer: c.* Only dental nurses who have attended an appropriate dental radiography training course, and been successful in the associated examination for that subject, can expose a patient to ionising radiation legally. Any of the other options listed can be carried out by any member of staff, once they have received the suitable training required.
32. *Correct answer: c.* All GDC registered dental team members should display their GDC registration certificate (or a copy of it) in the workplace, in view of any members of the general public who attend the premises. Most registration documents are displayed in the reception area, rather than the clinical area itself. This helps to prevent the certificates and their frames from becoming contaminated by aerosols produced in the surgery.
33. *Correct answer: b.* In the GDC publication 'Principles of Dental Team Working', under item 5 'Leading a team', it is stated that general nurses who are registered with the Nursing and Midwifery Council are legally allowed to assist in clinical procedures related to maxillofacial surgery.
34. *Correct answer: d.* All the other options listed are issues that can be overcome by good oral health advice and support from the dental team, or by patients becoming sufficiently motivated to make lifestyle changes for the benefit of their oral health. Physical disabilities, such as arthritis or paralysis, are much harder to manage, as little can be done to overcome

them by the patient. The dental team can suggest adaptations to oral hygiene products to help, but adequate daily oral maintenance will still be the responsibility of the patient or carer.

35. *Correct answer: c.* Leaning towards patients while they are speaking shows that they are being listened to, and that what they are saying is of interest to the listener. However, the listener must ensure that he or she does not lean too close into the patient's personal space, as this can appear threatening. All the other options listed are actions that will be seen as dismissive by patients and will indicate that they are not being listened to, or are actually being ignored.

14

Medical Emergencies

Multiple choice questions

1. A 50-year-old female patient with a medical condition starts to feel unwell during an amalgam filling procedure and is given glucagon by the dentist. Which one of the following medical emergencies is the patient experiencing?
 - (a) Anaphylactic shock
 - (b) Angina attack
 - (c) Asthma attack
 - (d) Diabetic hypoglycaemia
 - (e) Vasovagal syncope
2. Many dental workplaces now have automated external defibrillators (AEDs) on the premises to assist with the recognition and treatment of some medical emergencies. Which one of the following is an event for which the AED can be used?
 - (a) Angina
 - (b) Arrhythmia
 - (c) Asystole
 - (d) Valvular defect
 - (e) Ventricular fibrillation
3. One of the first aid events that the dental team should be able to manage effectively is a scald. Which one of the following is the most likely cause of this injury?
 - (a) Corrosive chemical
 - (b) Fire
 - (c) Steam
 - (d) Toxic chemical
 - (e) X-rays
4. A 20-year-old male is undergoing the first stage of endodontic treatment on the upper right central incisor. While the local anaesthetic is being given the patient

becomes pale, sweaty and distressed. Which one of the following medical emergencies is the patient experiencing?

- (a) Anaphylactic shock
 - (b) Angina attack
 - (c) Asthma attack
 - (d) Diabetic hypoglycaemia
 - (e) Vasovagal syncope
5. All members of the dental team have to be regularly trained and certificated in the recognition and handling of medical emergencies. Which one of the following is the current sequence of actions to follow in the event of a medical emergency?
- (a) ABC
 - (b) BLS
 - (c) CPR
 - (d) DRABC
 - (e) DRSABC
6. When a medical emergency occurs, the life of the casualty may depend on the correct recognition of the cause of the emergency. This is usually achieved by identifying the signs and symptoms present. Which one of the following is a sign rather than a symptom?
- (a) Dizziness
 - (b) Drowsiness
 - (c) Nausea
 - (d) Pain
 - (e) Skin colour
7. Every dental workplace must hold an emergency drugs box, with a recommended list of contents to be used in the event of a medical emergency on the premises. Which one of the following medications must be administered by injection rather than orally?
- (a) Aspirin
 - (b) Dextrose
 - (c) Glyceryl trinitrate
 - (d) Hydrocortisone
 - (e) Salbutamol
8. When administering basic life support, the rescuer needs to perform chest compressions at a rate and depth that is adequate to artificially circulate the casualty's blood. Which one of the following rates of compression is required to achieve adequate circulation?
- (a) 15 per minute
 - (b) 30 per minute
 - (c) 50 per minute

- (d) 100 per minute
 - (e) 150 per minute
9. When assessing the level of responsiveness of a casualty during a medical emergency, the scale that determines the level of consciousness of the casualty is usually referred to as 'AVPU'. Which one of the following is the meaning of 'A' in this scale?
- (a) Airway
 - (b) Alert
 - (c) Automatic
 - (d) Awake
 - (e) Away
10. All members of the dental team should be able to recognise and manage medical emergencies, not just to support life but also to give first aid treatment when necessary. Which one of the following actions should be taken in the event of an arterial bleed from the arm?
- (a) Apply a tourniquet for 1 hour
 - (b) Apply direct pressure
 - (c) Clean the wound
 - (d) Keep the limb level with the heart
 - (e) Remove any foreign object
11. When a patient experiences an angina attack, the recommended emergency course of action includes administering glyceryl trinitrate (GTN) spray beneath the tongue. Which one of the following is the reason why this medicine is administered in this way?
- (a) Avoids chewing a tablet
 - (b) Avoids sugar on the teeth
 - (c) Avoids tasting the medicine
 - (d) Fast circulatory absorption
 - (e) Prevents tooth staining
12. Various chemicals and materials used in dentistry are considered poisonous if they are ingested. In the event of a casualty being poisoned in the dental surgery, which one of the following sources provides advice on the first aid treatment required?
- (a) Accident book
 - (b) British National Formulary
 - (c) COSHH file
 - (d) Local Rules
 - (e) RIDDOR booklet
13. If a casualty is electrocuted by a faulty piece of equipment on the dental premises, it can result in complete loss of the heart beat, as the normal

- electrical conduction of the heart is deranged. Which one of the following first aid treatments would not be required for an electrocuted casualty?
- (a) Carry out BLS
 - (b) Defibrillation
 - (c) Minimise clinical shock
 - (d) Remove from the electrical supply
 - (e) Treat any burns
14. Many patients who attend the dental surgery for treatment are anxious and wary of experiencing pain. Some become so anxious that they begin to hyperventilate and induce a panic attack. Which one of the following actions should be taken by the rescuer during an attack?
- (a) Administer oxygen
 - (b) Allow rebreathing
 - (c) Begin abdominal thrusts
 - (d) Begin basic life support
 - (e) Clear the airway
15. A 55-year-old patient attends the dental surgery for the extraction of a grossly carious molar tooth, but begins to feel unwell while the local anaesthetic is being administered. The dentist gives the patient an aspirin tablet to chew. Which one of the following medical emergencies is the patient experiencing?
- (a) Anaphylaxis
 - (b) Asthma attack
 - (c) Hypoglycaemic episode
 - (d) Myocardial infarction
 - (e) Vasovagal syncope
16. When administering basic life support the rescuer needs to perform chest compressions and rescue breaths in a set ratio, or algorithm. Which one of the following is the current algorithm of breaths to compressions?
- (a) 1:5
 - (b) 1:15
 - (c) 1:30
 - (d) 2:15
 - (e) 2:30
17. Anaphylactic shock can occur as a life-threatening medical emergency in the dental workplace, with patients who have had a serious hypersensitivity reaction to an allergen such as latex. Which one of the following medicines is not required to treat this condition?
- (a) Adrenaline
 - (b) Chlorphenamine
 - (c) Diazepam
 - (d) Hydrocortisone
 - (e) Oxygen

18. The correct term for one of the emergency events that can occur in the dental workplace is 'vasovagal syncope'. Which one of the following is the lay term for this condition?
- (a) Attack
 - (b) Coma
 - (c) Faint
 - (d) Fit
 - (e) Seizure
19. As a member of the dental team, a dental nurse will be expected to participate in any medical emergency on the dental premises following the necessary training. Which one of the following actions is carried out by the dentist rather than the dental nurse?
- (a) Administration of drugs
 - (b) Basic life support
 - (c) Drawing up of drugs
 - (d) Use of face mask
 - (e) Use of portable suction
20. When a medical emergency occurs, identification of the correct cause is necessary before treatment can be given. This is achieved by recognising the signs and symptoms of the emergency. Which one of the following is the sign that will occur during anaphylaxis?
- (a) Cyanosis
 - (b) Grey pallor
 - (c) Hypotension
 - (d) Hypoxia
 - (e) Weak pulse
21. A 20-year-old male patient attends the dental surgery for a restorative procedure but begins to feel unwell while the local anaesthetic is being administered. The dentist checks the patient's medical history sheet and asks if he has his inhaler with him. Which one of the following medical emergencies is the patient experiencing?
- (a) Anaphylactic shock
 - (b) Asthma attack
 - (c) Choking
 - (d) Panic attack
 - (e) Vasovagal syncope
22. Cylinders containing oxygen must be kept at all dental premises for use in the event of a medical emergency as well as for sedation sessions. Which one of the following events does not require the use of oxygen?
- (a) Anaphylaxis
 - (b) Angina attack
 - (c) Hyperventilation episode

- (d) Myocardial infarction
 - (e) Tonic-clonic seizure
23. When a medical emergency occurs, the life of the casualty may depend on the correct recognition of the cause of the problem. This is usually achieved by identifying the signs and symptoms present. Which one of the following is a symptom rather than a sign?
- (a) Bleeding
 - (b) Collapse
 - (c) Difficulty breathing
 - (d) Presence of pulse
 - (e) Skin colour
24. Every dental workplace must hold an emergency drugs box, with a recommended list of contents to be used in the event of a medical emergency on the premises. Which one of the following medications must be administered orally rather than by injection?
- (a) Adrenaline
 - (b) Chlorphenamine
 - (c) Diazepam
 - (d) Glucagon
 - (e) Glyceryl trinitrate
25. Diabetes is a medical condition caused by dysfunction of specialised cells in the pancreas. On occasion, sufferers may experience an emergency after failing to take their medication correctly. Which one of the following medications does a diabetic patient not require in the event of a hypoglycaemic episode?
- (a) Dextrose
 - (b) Glucagon
 - (c) Insulin
 - (d) Oxygen
 - (e) Sucrose
26. When a patient experiences sudden-onset severe chest pain the dental team will assume that either an angina attack or a myocardial infarction is occurring. Which one of the following actions should the rescuer perform to aid the conscious casualty?
- (a) Administer glucagon
 - (b) Begin basic life support
 - (c) Lay casualty flat
 - (d) Maintain casualty upright
 - (e) Raise legs of casualty
27. The correct action taken by the dental team during a medical emergency can often reverse the signs and symptoms so that the patient recovers while on the

premises. The patient will then be advised to seek medical attention as soon as possible, rather than have paramedics attend at the time. Which one of the following medical emergencies always requires the presence of paramedics?

- (a) Anaphylactic shock
- (b) Asthma attack
- (c) Choking episode
- (d) Petit mal episode
- (e) Vasovagal syncope

Answers

Multiple choice questions

1. *Correct answer: d.* Glucagon is one of the emergency drugs that all dental workplaces must stock, in the event of diabetic patients developing hypoglycaemia. This occurs when their insulin regimen has not been followed correctly or when food has not been taken at the correct times. Their blood glucose levels will drop significantly in either instance, causing collapse and even unconsciousness. Glucagon is given as an emergency intramuscular injection to restore glucose levels quickly and avoid coma.
2. *Correct answer: e.* The electrical activity of the heart is seen as a regular wave pattern under normal circumstances, but can be disrupted or even stop in medical emergencies. One such disruption is called fibrillation, where the ventricles attempt to beat so rapidly that they are ineffective in pumping blood out of the heart. The AED machine, once connected to the patient, will recognise this condition and instruct the rescuer to shock the patient through the chest pads. The electrical shock applied should be powerful enough to override the faulty heart beat and return it to normal, a process called defibrillation.
3. *Correct answer: c.* A scald is a wet burn to the soft tissues, caused by steam or hot liquids. A burn is a soft tissue injury caused by dry heat (such as fire), chemicals or irradiation.
4. *Correct answer: e.* Vasovagal syncope is the correct medical term for a simple faint, the commonest medical emergency that occurs in the dental workplace. It is a brief loss of consciousness due to a temporary reduction in oxygenated blood to the brain, following a fall in blood pressure. It can be brought on by stressful situations, such as anxiety over dental treatment, and the signs include sudden pallor and profuse sweating.
5. *Correct answer: e.* The current sequence of actions is as follows.
 Danger: check for
 Responsiveness: determine if unconscious
 Shout: for help, if unconscious or abnormal breathing
 Airway: check airway for obstructions and remove
 Breathing: look, listen, feel for respiratory effort
 Compressions: begin chest compressions
6. *Correct answer: e.* Signs are what the rescuer can see with regard to the casualty, whereas symptoms are what the casualty feels and can report to the rescuer if not unconscious. The rescuer will see the colour of the casualty's skin.

7. *Correct answer: d.* Hydrocortisone is a steroid used as a second-line drug for an anaphylactic event, and is given as an intramuscular injection. All the other options listed are given orally, as tablets, sprays or through inhalers.
8. *Correct answer: d.* This is the current recommended rate of compressions during a basic life support procedure, and is fast enough to ensure an adequate circulation for the casualty until professional help arrives. It is physically exhausting for the rescuer to maintain this rate for any length of time, and it is normal procedure for rescuers to take turns in carrying out chest compressions.
9. *Correct answer: b.* The AVPU scale of consciousness level is as follows.
Alert: fully responsive and able to communicate effectively
Verbal: responds to verbal commands
Pain: responds to painful stimuli (such as an ear pinch)
Unconscious: unresponsive to any stimuli
10. *Correct answer: b.* The first aid aim in this situation is to restrict the blood flow to the wound so that clotting may occur to prevent further blood loss. The immediate action is to apply direct pressure to the wound (using a pad or dressing) and to raise the wound above the level of the heart if possible. Foreign objects must never be removed, as their extrication is likely to cause further damage. Cleaning the wound will disturb any clot formation, and if a tourniquet has to be applied as a last resort it should only be in place for up to 15 minutes at a time.
11. *Correct answer: d.* The sublingual area of the mouth has a very thin mucous membrane covering, which allows drugs such as GTN to be absorbed rapidly. The area also has a very rich blood supply, so the absorbed drug is transported to the heart very quickly.
12. *Correct answer: c.* Details of all potentially harmful chemicals used in the dental workplace are stored in a file, under the COSHH regulations (Control of Substances Hazardous to Health). For each chemical referred to in the file, the following information must be recorded: hazardous ingredient(s), nature of the risk, health effects caused, precautions for safe handling, additional control methods (where necessary), and first aid measures required in the event of an accident.
13. *Correct answer: b.* Electrocutation tends to result in asystole (absence of any heart activity) rather than fibrillation (ineffective rapid ventricular activity), so defibrillation is unlikely to be required. All the other options listed are correct first aid procedures in the event of electrocution, while professional help arrives.
14. *Correct answer: b.* When patients become anxious and begin to panic, they tend to hyperventilate – they breathe at a fast rate, and too deeply, often

causing dizziness. Hyperventilation occurs due to the release of more carbon dioxide from the lungs than the body is normally producing, so that a chemical imbalance occurs in the blood. By allowing casualties to re-breathe their carbon dioxide-rich expired air, often using a paper bag as a reservoir, the chemical imbalance is restored and the respiratory rate slows and becomes normal again. The panic attack is then over.

15. *Correct answer: d.* Aspirin is an anticoagulant medicine that must be kept in the emergency drugs box of all dental workplaces, for use when a suspected myocardial infarction occurs. In this emergency situation, one or more of the patient's coronary arteries have become blocked by a thrombus, and the aspirin acts to prevent further clot formation and further arterial blockage. It is stored as 300-mg tablets, and the casualty should be instructed to chew it before swallowing, as it acts more rapidly when taken in this way.
16. *Correct answer: e.* This is the current breath to compression algorithm as advised by the Resuscitation Council.
17. *Correct answer: c.* Diazepam is an anxiolytic drug (sedative) that is used to help anxious patients to overcome their dental fears, so that they are able to receive regular treatment. In the emergency situation, it is used for a casualty suffering from a prolonged severe epileptic seizure, a condition called 'status epilepticus'. All the other options listed are treatments for use during an anaphylactic episode.
18. *Correct answer: c.* Syncope is a brief loss of consciousness due to a fall in blood pressure, while vasovagal syncope refers specifically to this event when caused by overactivity of the vagus nerve (cranial nerve X). This overactivity results in the classic signs and symptoms of a faint: pallor, profuse sweating, nausea and a weak pulse (often described as 'thready'). The reduction in oxygenated blood to the brain that is produced causes a brief episode of unconsciousness.
19. *Correct answer: a.* In any medical emergency, the most senior member of the team will take charge and be responsible for the management and coordination of the rescue efforts. This will usually be the dentist. However, in an emergency certain prescription-only medicines may be given to a casualty for the purpose of saving life, and there is no specific restriction on who may administer these medicines. They include adrenaline and hydrocortisone injections, so in the absence of a dentist during a medical emergency, the dental nurse should indeed be prepared to administer these drugs to save a patient's life.
20. *Correct answer: c.* Hypotension, or a systolic blood pressure of less than 90 mmHg, is a classic sign of anaphylaxis that appears in contradiction to the other signs – rapid facial swelling and skin redness, and breathing difficulties. None of the other options listed occur during an anaphylactic reaction.

21. *Correct answer: b.* Asthma is a diagnosed hypersensitivity condition affecting the respiratory airways, which narrow during an attack so that exhalation is particularly difficult. Sufferers have usually been prescribed an inhaler containing salbutamol for use as required during an asthma attack. It must also be one of the emergency drugs kept on the premises by all dental workplaces.
22. *Correct answer: c.* A hyperventilation episode is also known as a panic attack. During the episode a chemical imbalance of carbon dioxide and oxygen occurs in the blood, causing hyperventilation. The imbalance is corrected by allowing casualties to re-breathe their expired air, with its higher carbon dioxide levels. Administering oxygen to the casualty would prolong the emergency.
23. *Correct answer: c.* A symptom is what the patient feels and experiences during the emergency, rather than a sign which is seen by the rescuer in relation to the casualty. The casualty will feel difficulty in breathing, while the rescuer will see any of the other options listed.
24. *Correct answer: e.* Glyceryl trinitrate is supplied as a spray to be administered sublingually in the event of a suspected angina attack. All the other options listed require administration by injection.
25. *Correct answer: c.* During a hypoglycaemic episode, the casualty will have too much insulin and too little glucose available in the circulating blood. To administer insulin under these conditions could cause death. Any of the other options listed can be safely administered to the casualty during a diabetic hypoglycaemic episode.
26. *Correct answer: d.* With either suspected medical emergency, the chest pain is significantly worsened if the casualty is laid down. The rescuer must assist the casualty to remain sitting upright, as long as he or she is conscious.
27. *Correct answer: a.* Any of the other options listed can be completely and successfully managed by the dental team. Anaphylaxis is a severe life-threatening hypersensitivity reaction, and its occurrence for whatever reason must always be followed up by professional emergency care.

INDEX

- abrasion cavities 85
- abscesses 74, 76
- acidity
 - assessment and diagnosis 69
 - microbiology and pathology 40, 43, 50
 - oral hygiene 158
- acute necrotising ulcerative gingivitis 45, 52, 158
- acute periapical abscesses 74
- additional duties 132, 146
- AED *see* automated external defibrillators
- aesthetic restoration 91–2, 95–6, 145
- air turbine handpieces 90
- ALARP/ALARA principle 143
- alcohol 42
- allergic reactions 10, 236
- alveolar processes 53
- alveolectomy 114–15, 223
- amalgam
 - health and safety issues 202–5, 207
 - medical emergencies 233
 - pre- and post-operative advice 178–9
 - restorative dentistry 88, 89, 91, 93–5, 99
- anaesthesia
 - anatomy and physiology 10, 24–5, 27–8, 32
 - health and safety issues 204–6
 - medical emergencies 233–4, 236–7
 - pre- and post-operative advice 173, 176, 178–80
 - restorative dentistry 91, 98
 - surgical procedures 113–19
- analgesia 11, 14, 45, 179–80, 236
- anaphylactic shock 236–7
- anatomy and physiology
 - answers to EMQs 21–2, 36–8
 - answers to MCQs 15–21, 33–6
 - dental 53
 - extended matching questions 12–14, 30–2
 - general 3–22
 - medical conditions 4–12, 13–14
 - multiple choice questions 3–12, 23–30
 - oral 23–37
- angina attacks 235, 238
- Angle's classification 70–1
- anterior caries 74–5
- antiseptic dressings 93
- anxiety control 115–16, 118, 179, 236
- apicectomy 119, 222
- artificial sweeteners 158–9
- asepsis 200–1
- aspirin 14, 236
- assessment and diagnosis 65–84
 - answers to EMQs 84
 - answers to MCQs 77–83
 - extended matching questions 75–6
 - multiple choice questions 65–75
- asthma 10, 45
- atmospheric pollution 14
- autoclaves 199, 208
- automated external defibrillators (AED) 233
- Bacillus fusiformis* 158
- bacterial infections
 - anatomy and physiology 11
 - health and safety issues 208
 - microbiology and pathology 40, 43, 47, 49–51

- bacterial infections (*cont'd*)
 - pre- and post-operative advice 175–6
 - restorative dentistry 89
 - teamwork 223–4
- bad tastes 116, 164
- Basic Life Support 130
- basic periodontal examination (BPE) 66, 69–71, 165
- bitewing radiography 68, 143, 165, 203
- Black's classification 85
- blood and bleeding
 - anatomy and physiology 9–10, 13
 - health and safety issues 206–7
 - medical emergencies 235
 - oral hygiene 165
 - pre- and post-operative advice 178, 180–1
- blood clots 8
- blood vessels 3–4, 6–11
- bonded appliances 180–1
- bone loss 73
- bone removal 115, 120
- bony plates 24–5, 30
- bony retention 97
- bony sockets 53
- BPE *see* basic periodontal examination
- bridges
 - assessment and diagnosis 76
 - pre- and post-operative advice 175, 181
 - restorative dentistry 96–7, 100
- bronchial asthma 10
- bronchitis 7–8
- bruxism 42, 66

- calcium hydroxide 86, 88–9, 93–4
- calculus formation 41–2, 44, 51
- canine teeth
 - anatomy and physiology 6, 25
 - assessment and diagnosis 66, 71, 75
 - health and safety issues 203
 - oral hygiene 164–5
 - pre- and post-operative advice 178
 - surgical procedures 114–16
 - teamwork 219
- cardiovascular system 3–13
- Care Quality Commission (CQC)
 - GDC Standards 130, 132
 - health and safety issues 202
 - legal and ethical issues 140
- record keeping 189, 191, 193
- teamwork 220, 224
- caries *see* dental caries
- cariogenic bacteria 89, 223–4
- cariostatic properties 91–2
- cavities
 - assessment and diagnosis 68, 76
 - health and safety issues 204
 - microbiology and pathology 39, 43
 - oral hygiene 159, 165
 - pre- and post-operative advice 176
 - restorative dentistry 85, 87–9, 92–6, 99
 - teamwork 223
 - see also* dental caries
- cements 86–7, 89–96
- cementum 30
- chemical hazards 200–5, 235
- chest compressions 234–6
- chipped teeth 163
- chronic gingivitis 44–6, 51, 67
- chronic obstructive airways disease 162
- chronic periodontitis 44, 51, 52
- cirrhosis 7
- clicking sensations 181
- cold sensitivity 70, 75, 163–5
- cold sores 45, 47
- collagen 25
- communication skills 158, 161–3, 223, 226
- complaints procedures 140, 142, 225
- composite 86, 88–9, 92, 95, 98, 176
- confidentiality 132–3, 140–1, 189, 191, 221, 223–4
- coning 143
- consent
 - answers to MCQs 194–6
 - GDC Standards 132–3
 - legal and ethical issues 139, 140–1
 - multiple choice questions 189–93
 - record keeping 190–2
 - teamwork 221, 225
- consignment notes 191–2, 206
- construction procedures 86–7, 97, 221–2, 224
- Continuing Professional Development (CPD) 129–31
- Control of Substances Hazardous to Health (COSHH) regulations 191, 203
- core subjects 129
- coronoid process 29

- COSHH *see* Control of Substances
 Hazardous to Health
 CPD *see* Continuing Professional
 Development
 CQC *see* Care Quality Commission
 cranial nerves 7, 29, 31–2
 cranium 30–1
 cross-infections 199, 201, 205–6, 208, 210
 crowding 69, 76
 crowns
 GDC Standards 129
 health and safety issues 206
 microbiology and pathology 40
 oral hygiene 164
 pre- and post-operative advice 177–8
 restorative dentistry 85, 91, 94–5, 100
 surgical procedures 117
 teamwork 220
 curing lights 89, 95

 débridement 99
 decontamination procedures 206–8, 210
 deep vein thrombosis (DVT) 6–7
 demineralisation
 assessment and diagnosis 66, 69
 microbiology and pathology 39, 43
 oral hygiene 159
 dental caries
 assessment and diagnosis 65, 68,
 70–5, 76
 health and safety issues 204–5
 medical emergencies 236
 microbiology and pathology 40, 43,
 48, 51, 52
 oral hygiene 157–60, 162
 pre- and post-operative advice 181
 restorative dentistry 87–9, 91–5, 98–9
 teamwork 220–1, 224
 dental charting *see* FDI charting notation
 dental materials 86–96
 dental nurse managers 130–1
 dental records 133, 147, 149–52,
 189–90, 192
 dentine 25
 dentition
 anatomy and physiology 24, 25–8, 53
 assessment and diagnosis 66, 70, 75
 oral hygiene 164–5
 teamwork 219

 dentrine 90–1
 denture stomatitis 47
 dentures
 microbiology and pathology 40
 pre- and post-operative advice 174,
 176–8, 181
 restorative dentistry 86–7, 91, 96–7, 100
 surgical procedures 115, 120
 teamwork 221–2, 224
 detergent foods 72, 161
 diabetes mellitus 6, 9, 238
 diagnosis *see* assessment and diagnosis
 dietary factors
 assessment and diagnosis 68–9, 72
 GDC Standards 132
 microbiology and pathology 39, 43, 48
 oral hygiene 158–9, 161–4
 pre- and post-operative advice 181
 digestive system 3–5, 7–9, 13, 26
 digit sucking 72
 discolouration 96, 157, 175, 177
 discrimination 142–3
 disposal *see* waste management
 DMF counts 160
 documentation *see* medical history; record
 keeping
 drinking water 41
 duty of confidentiality 132–3, 223
 DVT *see* deep vein thrombosis

 electric pulp testers 177
 electrocution 235–6
 emergency treatments 174–5, 178
 see also medical emergencies
 enamel
 anatomy and physiology 27, 30
 assessment and diagnosis 66, 69, 73, 75
 microbiology and pathology 39, 43
 oral hygiene 157–60
 endocrine glands 9
 endodontic treatment
 assessment and diagnosis 67
 medical emergencies 233–4
 restorative dentistry 90–2, 95–6, 99
 surgical procedures 118
 enzymes 13
 epilepsy 113, 120
 epulis 114
 erythrocytes 12

- etching techniques 88, 98
- ethical issues 132–3, 139–53
 - answers to EMQs 153
 - answers to MCQs 148–52
 - extended matching questions 146–7
 - multiple choice questions 139–46
 - record keeping 191
- ethyl chloride 175
- eugenol cement 87, 95
- extirpation 85
- extractions
 - anatomy and physiology 7–8, 11, 23–5
 - assessment and diagnosis 70, 76
 - health and safety issues 203, 206–7
 - legal and ethical issues 140, 145
 - pre- and post-operative advice 174–6, 178–81
 - surgical procedures 113, 115–16, 118, 120
- faceting 42
- facial expression 31
- FDI charting notation 67–8, 71, 76
- fire safety 200, 201, 204
- first aid treatments 233–6
- fixed bonded appliance 180–1
- fluid sacs 47
- fluoride 41, 72–3, 158–60, 162
- fluorosis 73
- formal complaints 140, 142, 225
- fractured teeth
 - assessment and diagnosis 68, 70, 74, 75
 - GDC Standards 129
 - legal and ethical issues 145
 - oral hygiene 164
 - pre- and post-operative advice 174–6
 - restorative dentistry 98
 - surgical procedures 117
- full mouth assessments 219
- fungal infections 47, 208
- gastric reflux 8–9
- General Dental Council (GDC)
 - Standards 129–37
 - answers to MCQs 134–7
 - legal and ethical issues 146–7
 - multiple choice questions 129–33
 - record keeping 192–3
 - teamwork 219–20, 222, 225–6
- genetic factors 14, 46
- gingivae
 - anatomy and physiology 49, 52, 53
 - oral hygiene 158
 - surgical procedures 119, 120
- gingival hyperplasia 49–50, 164
- gingivectomy 113
- glass ionomer cements 86, 92, 94, 96
- glucagon 233
- glyceryl trinitrate (GTN) 11, 235
- gold crowns 85, 91, 117
- GTN *see* glyceryl trinitrate
- gums 120, 164, 178
- gutta percha 173
- haemorrhage *see* blood and bleeding
- halitosis 41, 52, 117, 158, 164
- hand-washing techniques 199
- hazardous wastes 207, 210
- health monitoring 202
- Health and Safety at Work legislation 200, 203, 205
- health and safety issues 199–217
 - answers to EMQs 217
 - answers to MCQs 211–16
 - extended matching questions 209–10
 - multiple choice questions 199–209
- heart 3, 5–6, 9, 11
- hepatitis B 8
- HIV/AIDS 201
- hormones 13
- hot sensitivity 165
- hydroxyapatite 27
- hyperplastic gingivae 28, 119
- hypersensitivity reactions 236
- hypertension 164
- hyphae 50
- hypodontia 65
- hypoglycaemia 238
- iatrogenic plaque retention factors 51
- impacted teeth 75, 114, 116–17
- implants 96–7
- impression materials 86–7, 94, 97, 100
- incisor teeth
 - anatomy and physiology 11, 25–6
 - assessment and diagnosis 67–8, 73–4
 - legal and ethical issues 145
 - medical emergencies 233–4

- microbiology and pathology 42
- oral hygiene 163–5
- pre- and post-operative advice 173–8, 181
- restorative dentistry 88, 92, 98, 100
- surgical procedures 115, 117–18
- teamwork 222, 225
- Index of Treatment Needs (IOTN) 67, 180
- indirect cross-infections 201
- induction training 142, 199–200
- infections
 - anatomy and physiology 8
 - assessment and diagnosis 76
 - GDC Standards 129
 - health and safety issues 199–201, 205–6, 208, 210
 - microbiology and pathology 40–2, 44–5, 47, 49–51
 - oral hygiene 158
 - pre- and post-operative advice 175–6
 - restorative dentistry 89
 - surgical procedures 118
 - teamwork 223–5
- inflammation
 - assessment and diagnosis 68, 74
 - microbiology and pathology 45–6, 48, 51
- inhalation sedation 116, 118
- inhalers 237
- inlays 93
- INR *see* International Normalised Ratio
- INR scores 117
- instrumentation
 - health and safety issues 208–10
 - microbiology and pathology 41–2
 - restorative dentistry 85, 86–8, 90–2, 94, 96–9
 - surgical procedures 113, 115–17, 119
 - teamwork 220–5
- insulin 13
- International Normalised Ratio (INR)
 - cards 8, 14
- interproximal cleaning 160
- interproximal lesions 43, 70–1, 88
- interproximal overhang 98
- intra-oral radiographs 72–4
- intravenous drug users 140
- intravenous sedation 173
- ionising radiation *see* radiography
- IOTN *see* Index of Treatment Needs
- IR(ME)R regulations 143–4, 146–7, 190, 193, 202, 209–10
- IRR 99 144, 146–7, 190, 209–10
- irrigation 98
- jaundice 179
- lacerations 76
- legal issues 132–3, 139–53
 - answers to EMQs 153
 - answers to MCQs 148–52
 - extended matching questions 146–7
 - health and safety issues 199–217
 - multiple choice questions 139–46
 - record keeping 189–92
 - teamwork 221–3, 225–6
- lesions
 - assessment and diagnosis 74, 76
 - microbiology and pathology 43
 - restorative dentistry 85, 98
 - surgical procedures 114, 119
- life support 234–6
- lingual extensions 176
- lining materials 94–6
- lips 76
- liver 3, 7
- local anaesthesia *see* anaesthesia
- lungs 3–8, 14
- luting cements 91
- malignancies 42, 48, 97
- malocclusions 67, 70, 76, 174, 179
- mandible 26–8, 31–2, 53, 119
- Maryland bridges 97
- mastication 29, 31–2
- matrix systems 89
- maxilla 32, 53
- measles–mumps–rubella (MMR)
 - vaccine 52
- median diastema 118
- medical emergencies 233–43
 - answers to MCQs 240–3
 - multiple choice questions 233–9
- medical history
 - anatomy and physiology 4–12, 13–14
 - assessment and diagnosis 65
 - health and safety issues 201
 - legal and ethical issues 140–1, 143–5

- medical history (*cont'd*)
 - medical emergencies 237–8
 - pre- and post-operative advice 179
 - record keeping 189–90
- meniscus 31
- mercury *see* amalgam
- mesiobuccal cusp 71
- metformin 6
- microbiology and pathology 39–63
 - answers to EMQs 62–3
 - answers to MCQs 54–61
 - dental anatomy 53
 - extended matching questions 51–3
 - multiple choice questions 39–51
- missing teeth
 - assessment and diagnosis 75, 76
 - pre- and post-operative advice 174
 - restorative dentistry 96–7
 - surgical procedures 114
- mixed dentition 164–5
- MMR *see* measles–mumps–rubella
- mobile teeth 72, 118, 165
- moisture control 90
- molar buccal gingivae 32
- molar teeth
 - anatomy and physiology 6, 10–11, 23–4, 27–8
 - assessment and diagnosis 68–9, 71–2
 - GDC Standards 129
 - health and safety issues 204–7
 - legal and ethical issues 140
 - medical emergencies 236
 - microbiology and pathology 50
 - oral hygiene 164
 - pre- and post-operative advice 174–80
 - restorative dentistry 85, 87–8, 91–4, 99
 - surgical procedures 113–17, 120
 - teamwork 224
- mouthwash 158
- mucoperiosteal flaps 119, 222
- mumps 52
- musculature 24–6, 29–32, 181
- myocardial infarction 238
- nasal cavity 28–9
- National Health Service (NHS) claim forms 141
- nervous system
 - anatomy and physiology 6–8, 23–4, 26–9, 31–2
 - surgical procedures 113–19
 - see also* anaesthesia
- neurones 6
- newly qualified dentists 147
- NHS *see* National Health Service
- nitrous oxide 116
- numbness 140
- nutrition *see* dietary factors
- obesity 160
- omeprazole 8–9
- operculectomy 115
- oral cancer 42, 48, 97, 162
- oral cavity
 - anatomy and physiology 23–4, 26, 28–9, 32
 - assessment and diagnosis 65
 - microbiology and pathology 41, 44, 47–8
 - oral hygiene 157
 - restorative dentistry 97
- oral hygiene 120, 157–71
 - answers to EMQs 170–1
 - answers to MCQs 166–70
 - assessment and diagnosis 72–3
 - extended matching questions 163–5
 - GDC Standards 132
 - health and safety issues 208
 - microbiology and pathology 44–5, 47, 49–50
 - multiple choice questions 157–63
 - pre- and post-operative advice 174–5, 177
 - teamwork 224–6
- orthodontic treatment
 - assessment and diagnosis 66–7, 69–71, 74, 76
 - pre- and post-operative advice 174–5, 177, 179–81
 - surgical procedures 118
- osteoarthritis 9
- oxygen administration 237–8
- pain
 - assessment and diagnosis 69, 72, 74
 - health and safety issues 203
 - legal and ethical issues 140

- microbiology and pathology 41, 45, 52
- oral hygiene 158, 164
- pre- and post-operative advice 179–81
- surgical procedures 116–17, 120
- palatal gingivae 32
- palate 40
- pancreas 7, 14
- panic attacks 236
- panoramic tomography 116–17
- pantomography 66
- paramedics 239
- parotid salivary glands 29–30, 43
- pathology *see* microbiology and pathology
- patient records 133, 147, 149–52, 189–90, 192
- penicillin 10
- pepsin 13
- periapical radiography 70, 74, 114, 141, 145
- pericoronitis 117
- periodontal disease
 - assessment and diagnosis 67–8, 73–5
 - microbiology and pathology 40, 42, 44, 47, 49–52
 - oral hygiene 157–8, 160–1
- periodontal ligaments 23, 25, 115–16
- periodontium 44, 53, 66, 70–2
- periosteal flaps 114–15, 119, 223
- personal protective equipment (PPE) 202
- pH scale
 - assessment and diagnosis 69
 - microbiology and pathology 40, 43, 50
 - oral hygiene 158
 - surgical procedures 113
- pharmaceutical treatments
 - anatomy and physiology 4–6, 8–11, 14
 - legal and ethical issues 139
 - medical emergencies 234–6, 238
 - microbiology and pathology 40, 45, 47, 49–50
 - oral hygiene 164
 - record keeping 189
 - surgical procedures 117, 120
- physiology *see* anatomy and physiology
- plaque
 - microbiology and pathology 42, 47, 49–51
 - oral hygiene 158–60
 - teamwork 226
- plastic restorations 89, 95
- pontics 76, 96, 181
- porcelain veneers 145
- post-operative advice 173–87
 - answers to EMQs 187
 - answers to MCQs 182–7
 - extended matching questions 181
 - health and safety issues 203
 - multiple choice questions 173–80
- post-registration qualifications 133
- PPE *see* personal protective equipment
- pregnancy 43
- premolar teeth
 - anatomy and physiology 24
 - assessment and diagnosis 70
 - legal and ethical issues 145
 - pre- and post-operative advice 176, 178–9, 181
 - restorative dentistry 88, 90, 98
 - surgical procedures 113, 118
 - teamwork 221, 223
- pre-operative advice 173–87
 - answers to MCQs 182–7
 - multiple choice questions 173–80
- preparation margins 220
- prescriptions 139
- pressure vessels 209
- prosthodontic treatment 99–100
- Public Interest Disclosure Act 222–3
- Public Interest Disclosure Act (1998) 131
- pulp chamber
 - microbiology and pathology 40, 46, 76
 - restorative dentistry 86, 88–9, 99
 - teamwork 223–4
- pulpectomy 99
- pulpotomy 86
- pus formation 46
- quality assurance 141, 143–5
- radiation monitoring badges 140
- radiation safety assessments 139
- radiography
 - assessment and diagnosis 65–76
 - health and safety issues 200, 203, 209
 - legal and ethical issues 141–7
 - oral hygiene 164–5
 - pre- and post-operative advice 173–5, 177–8

- radiography (*cont'd*)
 - record keeping 190, 192
 - restorative dentistry 98–9
 - surgical procedures 114–17, 120
 - teamwork 219
- raising concerns 129–32, 141–2, 147, 222–4
- reactionary haemorrhage 180
- record keeping 189–96
 - answers to MCQs 194–6
 - GDC Standards 130
 - health and safety issues 201, 206
 - legal and ethical issues 141, 143–7
 - multiple choice questions 189–93
 - teamwork 220
 - see also* medical history
- referrals 131, 219
- registered general nurses 226
- respiratory system 3–8, 10, 12, 14, 28–9
- restorative dentistry 85–112
 - anatomy and physiology 6, 27
 - answers to EMQs 110–12
 - answers to MCQs 101–10
 - assessment and diagnosis 75, 76
 - endodontic treatment 90–2, 95–6, 99
 - extended matching questions 98–100
 - GDC Standards 129
 - health and safety issues 202–6
 - legal and ethical issues 145
 - medical emergencies 237
 - multiple choice questions 85–98
 - pre- and post-operative advice 175–6, 178–9
 - prosthodontic treatment 99–100
 - record keeping 193
 - surgical procedures 118
 - teamwork 221–2, 224
- retained deciduous teeth 68
- retainers 96
- retaliation 141–2, 222–3
- retrograde tooth filling 95
- RIDDOR legislation 204
- risk assessments 200, 203
- root canal therapy
 - anatomy and physiology 6, 11
 - assessment and diagnosis 71
 - pre- and post-operative advice 175–6, 178
 - restorative dentistry 85, 87–8, 90–1, 93–4, 96, 98–9
 - teamwork 221–2
- root filling 177, 222
- root posts 164
- roots
 - microbiology and pathology 40
 - restorative dentistry 88
 - surgical procedures 114, 117, 119
- rubella vaccine 199
- safety warning symbols 201, 205
- salbutamol 4
- saliva
 - anatomy and physiology 23, 26–7, 30
 - microbiology and pathology 41, 43, 48
 - restorative dentistry 91
- scalds 233
- scale and polish 145
- Scope of Practice 132, 146, 192–3, 219, 225–6
- secondary dentition 28
- sedation 7–8, 116, 118, 173
- side-bevelled needles 98
- Siqveland matrix systems 89
- skeletal system 24–8, 30
- skull 24–5, 30
- slow-speed handpieces 87
- smoking 14, 42, 52, 119, 161
- soft linings 97
- soft tissue 75, 113
- special wastes 204, 207
- spillages 205, 207
- staff training
 - health and safety issues 199–200
 - medical emergencies 237
 - record keeping 192
 - teamwork 221, 225–6
- staining 157
- stainless steel clasps 177
- standard precautions 208
- sterilisation 199, 207–8, 210
- steroids 5
- subgingival calculus 51
- submandibular salivary glands 30, 43
- sudden onset cold sensitivity 75
- sugars 39, 48, 68, 158–9
- supragingival calculus 41–2, 51
- surface wear/loss

- assessment and diagnosis 66, 69
- microbiology and pathology 42, 50
- restorative dentistry 98
- surgical procedures 113–25
 - answers to EMQs 124–5
 - answers to MCQs 121–4
 - extended matching questions 120
 - multiple choice questions 113–19
- suturing 76
- swallowing 26
- swollen gums 120, 164
- syringes 98
- taste sensation 24, 31, 116
- teamwork 219–32
 - answers to MCQs 227–32
 - multiple choice questions 219–26
- teeth sensation
 - anatomy and physiology 32
 - assessment and diagnosis 70, 75
 - microbiology and pathology 50
 - oral hygiene 163–5
 - pre- and post-operative advice 173, 175, 177–8
 - restorative dentistry 90, 98
- temperomandibular joint 26, 31
- temporary restorations 90–1, 95
- thermal sensitivity 90, 98
- three unit fixed–fixed bridges 76
- thrush 47
- thumb sucking 72
- tongue
 - anatomy and physiology 4, 23–4, 31
 - legal and ethical issues 140, 143
 - microbiology and pathology 40
 - surgical procedures 119
- tooth decay *see* dental caries
- toothache 164
- toothbrushing technique 69, 157, 160–1, 164–5
- toothpastes 157–8, 160, 165
- topical fluoride 162
- trachea 12
- trainee dental nurses 202
- traumatic injury
 - anatomy and physiology 6
 - assessment and diagnosis 74, 76
 - pre- and post-operative advice 178
 - restorative dentistry 86, 89, 94, 98
- trigeminal nerve 28–9, 31–2, 119
- type II diabetes 6, 9
- ulcerated gingivae 41
- ulcerative colitis 5
- ulcers 119, 180
- undercuts 93, 100
- urine sampling 202
- vaccination 46–8, 52, 199–200, 202
- valid consent 139, 190–2, 225
- vasovagal syncope 237
- verifiable CPD 129–31
- vigorous toothbrushing 69, 165
- viral infections 44–5, 200, 202, 208
- vitality *see* teeth sensation
- warfarin 14
- waste management 200, 203–4, 207, 210
- wax rims 97, 100, 224
- whitening toothpastes 165
- wisdom teeth 27
- workplace policies 129
- wound healing 157
- X-ray *see* radiography
- xerostomia 4, 40
- zinc oxide 87, 89, 92, 95
- zinc phosphate cement 89, 92